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DEFENSE LOGISTICS AGENCY MARKET BASKET

SEPTEMBER 1995

FOR

DEPARTMENT OF DEFENSE
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INSIGHT THROUGH ANALYSIS

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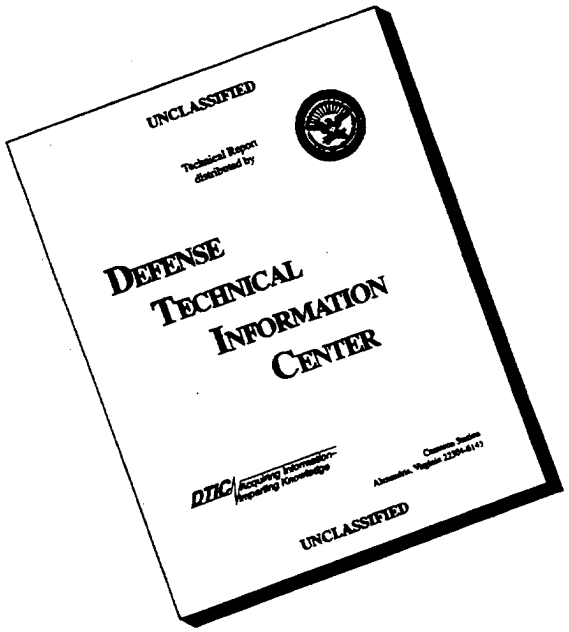

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FOREWORD

Two separate directorates at Headquarters, Defense Logistics Agency (HQ DLA) have been integral to the development of the Market Basket study. Procurement (MMP) is tasked with the oversight of the process of acquiring materials which are then sold to the services. Supply Management (MMS) is responsible for management of all material supplied by the Defense Logistics Agency (DLA).

The goals of these directorates encompass support of recent directives by HQ to find ways for DLA to carry out its mission better, faster and more economically. The Market Basket project focuses on the area of economics, the affordability issue.

The primary objective of this study effort was to provide management with the ability to evaluate DLA performance in controlling the material cost of items sold to the services. To meet this end, MMP and MMS wanted to develop a tool that tracks the cost behavior of items over time and compares this cost behavior to general market trends. Structured as an index, this measure would provide HQ DLA with the ability to assess their performance and to provide direction to the inventory control points (ICPs).

The analysis presented in this report was conducted under the guidance of both MMP and MMS. The HQ point of contact for the study, Phil Marchese, provided invaluable support and direction. Any success achieved by the Market Basket study is a direct result of his commitment to the project.

HAROLD BANKIRER
Colonel, USA
Chief, DLA Operations Research Office

EXECUTIVE SUMMARY

The primary objective of this study effort was to provide management with the ability to evaluate DLA performance in controlling the material cost of items sold to the services. To meet this end, MMP and MMS wanted to develop a tool that tracks the cost behavior of items over time and compares this cost behavior to general market trends. Structured as an index, this measure would provide HQ DLA with the ability to assess their performance and to provide direction to the inventory control points (ICPs).

Two separate measurements, a demand based set of indices, as well as a contract based set of indices, were developed that track DLA performance over time. These indices distinguish between the price of goods sold and material costs. The Demand-Based market basket consists of items sold. It is segmented by Service customer to measure price changes from the customer's perspective. The Contract-Based market basket consists of items bought by DLA. It indexes the change in the material cost experienced in the Supply Management Business Area.

Several versions of the Demand and Contract-Based indices are developed according to different levels of demand and/or procurement activity. This iterative approach ranges from assessing the impact of several hundred thousand less active items to evaluating items with demand and/or buying activity each year. Indices are first generated for a large population of NSNs. Next, smaller groups that exist within the large population are identified according to increased buying or demand patterns. Indices associated with specific iterations allow for comparisons based on different levels of activity.

The demand-based indices proved most valuable *in raising discussions* regarding measures of affordability and changes in customer price than in providing an actual measure of change in costs experienced by the customer. Results that surfaced from the study emphasized the effects of DLA pricing policy, inventory levels and demand patterns and their measurable effect on standard unit price indices for items sold in any given period. These factors are more influential over marginal changes in the ranges measured than material cost.

The contract-based market basket proved invaluable in identifying the contract types which exhibited the largest growth in prices. The most restrictive contract-based indices proved most reliable as a model of current acquisition processes. Indefinite Delivery Contracts (IDCs) showed minimal growth regardless of support method (i.e., Direct Vendor Delivery (DVD) or Stock). Items shifting to IDC DVD support did not exhibit a marked increase in absorbing other related costs, as was initially expected. More importantly, the contract-based indices also revealed wide variation in demand and buy patterns, suggesting that inventory policies can further be improved.

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INTRODUCTION

The Defense Logistics Agency (DLA) Corporate Plan focuses on two outcomes: military readiness and customer satisfaction. To achieve these objectives, the agency must carry out its mission better, faster and more economically. DLA uses three criteria to measure its performance: responsiveness, affordability and quality. DLA must improve its responsiveness to the customers' needs in terms of time, dependable weapon system support and ease of ordering. The agency must also be affordable in the eyes of the customer if DLA is to remain the supplier of choice. To the customer, affordability means getting a good value for their investment...a quality product at a fair price. Affordability depends upon DLA controlling its cost of operations as well as the cost of the material it buys to sell to its customer. By large margins, material costs are the predominant expense for the Supply Management business area. The Market Basket study addresses the affordability issue by focusing on items that are bought by DLA and then sold to the services.

1.1 BACKGROUND

The range of items that DLA sells in a given time period is much greater than the number of items that are bought through yearly material cost outlays. DLA manages a huge inventory, maintaining information on over three million NSNs. Of this vast number, only three to four hundred thousand have been bought within the previous three years. Procurement cycles for these relatively "active" items vary. Some items are bought every few months while others are bought every few years. DLA's inventory also consists of many items that are bought only once. Overall, DLA material can experience enormous variability in procurement and demand patterns from year to year. Yet DLA must be able to track the cost of its material.

Two separate directorates at HQ DLA directly affect the agency's success in tracking material costs. Procurement (MMP) is tasked with the oversight of the process of acquiring materials which are then sold to the services. Supply Management (MMS) is responsible for management of all material supplied by the DLA. To date, the agency has not had a "measure" that evaluates DLA performance in controlling the material cost of items sold to the services. The measure to be developed should provide insight into the change in material cost that DLA and its customers are paying for the same items over time while also enabling DLA to compare its performance to financial projections made to DoD in the Program Objective Memorandum (POM).

1.2 OBJECTIVES

The primary objective of the Market Basket study effort was to provide management with the ability to evaluate DLA performance in controlling the material cost of items sold to the services. To meet this end, MMP and MMS wanted to develop a tool that tracks the cost behavior of items over time and compares this cost behavior to general market trends. Structured as an index, this measure would provide HQ DLA with the ability to assess it's performance and to provide direction to DLA inventory control points (ICPs).

1.3 SCOPE

Indices are provided for the following commodities: construction, electronics, general, industrial and clothing and textiles. The Standard Automated Material Management System (SAMMS) provides all pertinent information for items that are evaluated. Information on fuel and subsistence items is not readily available and therefore indices for these commodities are not provided. Fuel items are tracked by the Defense Fuels Automated Management System (DFAMS), while subsistence items are tracked through the Defense Integrated Subsistence Management System (DISMS). Medical items were also not included because Prime Vendor arrangements prevent access to information required by the study. Procurement information for Prime Vendor medical items are not available on a line by line basis. Instead, data on hundreds to thousands of NSNs is rolled up into a single record that contains the total amount due for all NSNs provided to the services.

1.4 REPORT ORGANIZATION

This report is split into two main parts: preliminary data analysis regarding buy frequencies plus demand patterns and the development and construction of Market Basket Indices. Preliminary data analysis is covered in Section 2 and provides the reader with an understanding of the behavior of DLA items. Buying frequencies and NSN demand patterns were instrumental in structuring sub-populations that isolated DLA's most active items. The behavior of items observed during preliminary data analysis also played a major role in the study by supporting the validity of key decisions affecting the project approach and implementation. The remaining portion of the report covers the Market Basket Indices. Indices generated for various sub-populations have been included. Additional information on the population make-up is provided in Appendix A.

SECTION 2
PRELIMINARY DATA ANALYSIS

Before the Market Basket study began, work first had to be conducted on the items that would be evaluated. Preliminary data analysis identifies major characteristics or fundamental patterns peculiar to purchasing DLA inventory. Specifically, analysis tried to identify the behavior of DLA buying activity. Knowledge gained can circumvent potential problems in that assumptions or specific approaches can be tailored to accommodate shortcomings in the data. Preliminary data analysis is crucial if correct conclusions are to be drawn about the behavior of the system under analysis. Initially, items bought within the previous ten years were analyzed.

2.1 DLA BUYING PATTERNS

Figure 2-1 identifies the number of years between buys for all NSNs that have had any procurement activity within the previous ten years. The number of NSNs with procurement activity and the percent make-up of all of the items under analysis have been provided for each year and ICP. Most DLA items have been bought infrequently. Excluding medical, subsistence, and fuels, less than 6% of DLA stock was bought in FY94, and only 12.6% of the NSNs have been bought within the previous three years. About 58% of DLA NSNs were either bought more than 10 years ago or were Consumable Item Transfer (CIT) items that the services transferred into DLA inventory.

BUY STRATIFICATION

Number of Items
Percent of Items

Number of Years Since Last Buy	ICP DCSC	DESC	DGSC	DISC	C&T	TOTAL
1	53,575 7.5	45,982 4.3	32,256 5.1	65,364 6.0	3,477 12.8	20,0654 5.7
2	37,357 5.2	35,062 3.3	21,053 3.3	46,442 4.3	1,816 6.7	141,730 4.0
3	20,849 2.9	29,911 2.8	16,084 2.5	35,363 3.3	1,340 4.9	103,547 2.9
4	33,720 4.7	43,073 4.0	23,110 3.6	48,411 4.5	1,590 5.9	149,904 4.2
5	26,317 3.7	41,620 3.9	22,094 3.5	46,500 4.3	1,381 5.1	137,912 3.9
6	31,247 4.4	47,310 4.4	23,101 3.6	49,645 4.6	1,024 3.8	152,327 4.3
7	30,597 4.3	54,038 5.0	24,637 3.9	52,435 4.8	1,199 4.4	162,906 4.6
8	29,998 4.2	54,671 5.1	25,169 4.0	45,167 4.2	836 3.1	155,841 4.4
9	27,766 3.9	44,497 4.1	20,356 3.2	40,243 3.7	768 2.8	133,530 3.8
10	20,170 2.8	47,133 4.4	19,337 3.0	49,565 4.6	562 2.1	136,767 3.9
Total with Buys	**311,596 44.7**	**443,017 42.3**	**227,197 35.7**	**479,135 44.2**	**13,993 52.6**	**1,475,118 41.7**
NO BUY	**401,845 56.3**	**630,556 58.7**	**409,876 64.3**	**604,885 55.8**	**13,110 48.4**	**2,060,272 58.3**
GRAND TOTAL	**713,441 20.2**	**1,073,573 30.4**	**637,073 18.0**	**1,084,020 30.7**	**27,103 .8**	**3,535,390 100.0**

Figure 2-1. Number Of Years Since Last Buy (FY85-FY94)

Figure 2-1 is interesting, but it provides no hint as to the <u>*level of buying activity*</u> for each NSN under consideration. Specifically, do these items with procurement activity have frequent or infrequent buys? Furthermore, do all periods of equal length exhibit the same kind of characteristics? Or, are periods unique, where each experiences and reacts differently to various forces driving DLA? To determine if *buying behavior* changes over time, DORO compared direct vendor delivery (DVD) and Stocked buys in two equal time periods, 3 May 88 - 31 Sep 91 and 1 Oct 91 - 28 Feb 95. Time periods were chosen so that they would be *at least* as long as the three year period proposed for the Market Basket study. The only driving requirements were the need for two independent time periods of equal length. Results for stocked and DVD purchases for items with one buy and for items with multiple buys have been provided in two separate tables, Figures 2-2 and 2-3.

Between May 88 - Sep 91 and Oct 91 - Feb 95, the number of stocked items with one or more buys dropped for almost all of the ICPs. The only exceptions were C&T items with one buy that increased from 42% to 43% and DISC items with more than one buy which increased from 28% to 30%. In the first 40 month interval, items with only one stocked buy accounted for 46% of all items under analysis. Between Oct 91 - Feb 95, however, the number of stocked items with one time buys dropped to 33%. During these same time periods, stocked NSNs with more than one buy remained stable at 31%.

STOCKED

ICP	# NSNs With 1Buy: 3 May 88 - 31 Sep 91	% NSNs in ICP	1 Oct 91- 28 Feb 95	% NSNs in ICP
DCSC	62,306	32	42,228	26
DESC	109,579	51	58,489	39
DGSC	41,972	40	31,423	32
DISC	137,702	54	73,639	36
C&T	4,469	42	3,250	43
% of Total	46		33	

ICP	# NSNs With > 1Buy: 3 May 88 - 31 Sep 91	% NSNs in ICP	1 Oct 91- 28 Feb 95	% N SNs in ICP
DCSC	71,215	36	57,278	35
DESC	65,066	30	41,693	28
DGSC	32,333	31	28,531	29
DISC	71,943	28	62,824	30
C&T	5,459	51	3,578	47
% of Total	31		31	

Figure 2-2. Comparison Of Stocked Buys

During the same time periods, purchase of items supported by DVD contracts tended to increase. As shown in Figure 2-3, one time DVD buys rose from 12% to 18%, while DVD items with more than one buy increased from 11% to 17%.

DVD

ICP	# NSNs With 1 Buy: 3 May 88 - 31 Sep 91	% NSNs in ICP	1 Oct 91- 28 Feb 95	% NSNs in ICP	ICP	# NSNs With > 1 Buy: 3 May 88 - 31 Sep 91	% NSNs in ICP	1 Oct 91- 28 Feb 95	% NSNs in ICP
DCSC	28,582	15	29,896	18	DCSC	34,670	18	33,152	20
DESC	23,357	11	26,529	18	DESC	15,720	7	21,507	15
DGSC	13,632	13	18,650	19	DGSC	16,221	16	20,589	21
DISC	27,320	11	38,487	19	DISC	19,603	8	32,049	15
C&T	4,469	2	3,250	3	C&T	535	5	515	7
% of Total	12		18		% of Total	11		17	

Figure 2-3. Comparison Of DVD Buys

2.1.1 MEASUREMENTS FOR MEAN TIME BETWEEN BUYS

The counts shown in Figure 2-2 and 2-3 are beginning to identify various aspects of buying activity. However, other issues related to the buying frequency (i.e., repetitiveness over time) were still unresolved. Additional analysis was done in order to further characterize the data.

Several related indicators were initially generated that suggest the majority of DLA items are procured within a year of a previous buy. One particular measure, the mean time between buys, represents the average of the actual days between procurement iterations. This value, the mean time between buys, in addition to other related measurements (i.e., max and mode of the mean time between buys, etc.) are generated for NSNs with more than one buy during the previous ten years. Results are shown in Figure 2-4. However, mean number of days between buys is not a good indicator of buying patterns. This measurement proved to be misleading because it fails to emphasize the relative aspect of time. While these seemingly straightforward measurements support that procurement of items is fairly regular, they prove not to be. Mean times are influenced by clustered buying (to be discussed later), which is characterized by a series of buys in quick succession surrounded by large periods of inactivity.

NSNs With More than One Buy

COMM	PERIOD	STOCK	NSNS	MIN	25 PCTILE	50 PCTILE	75 PCTILE	MAX	MODE	MEAN	STND DEV
C	1	D	34,670	0	49	99	172	620	0	124.9	103.0
C	1	S	71,215	0	63	124	202	622	49	145.6	107.9
C	2	D	33,152	0	58	114	187	612	0	135.4	105.1
C	2	S	57,278	0	59	113	181	611	42	130-9	93.7
E	1	D	15,720	0	74	135	217	621	0	158.1	111.5
E	1	S	65,066	0	64	133	222	622	46	157.1	117.0
E	2	D	21,507	0	75	132	207	610	0	153.2	107.0
E	2	S	41,693	0	60	116	189	621	39	137.4	102.3
G	1	D	16,221	0	59	111	183	619	0	133.8	102.3
G	1	S	32,333	0	68	135	222	619	0	157.2	114.4
G	2	D	20,589	0	62	113	185	616	0	135.0	101.1
G	2	S	28,531	0	63	124	199	607	0	142.0	101.6
I	1	D	19,603	0	62	126	205	610	0	145.9	111.4
I	1	S	71,943	0	70	149	245	621	0	171.3	124.4
I	2	D	32,049	0	57	115	194	615	0	138.1	108.5
I	2	S	62,824	0	75	144	226	619	46	162.4	112.3
T	1	D	535	0	59	100	176	584	76	130.4	97.8
T	1	S	5,459	0	73	159	248	602	0	169.4	117.7
T	2	D	515	0	35	90	168	584	34	108.9	87.7
T	2	S	3,578	0	94	173	269	603	0	188.7	127.7

1=MAY 88-SEP 91
2=OCT 91-FEB 95

D=DVD
S=Stocked

Figure 2-4. Statistics For NSNs With More Than One Buy

The '75 PCTILE' column demonstrates that 75% of the 'mean time between buys' occur on average every half of a year (or slightly more). While not obvious from the table, 95% of all of the 'mean time between buys' occur anywhere between a year to fourteen months. The 'MODE' column also identifies that more than half of the categories have zero days between buys for the same item. While this seems illogical, further analysis revealed a substantial number of contracting actions where multiple procurements were made on the same day. The sheer number of these consecutive actions for the same NSN (with zero days between buys) also adds to the validity of the numbers presented.

2.1.2 CLUSTERED BUYING

Measurements of mean time between buys and their associated distributions are not accurate representations of inventory procurement practices. The measurements that are generated are heavily influenced by NSNs that have a several buys in quick succession followed by periods

of no activity. A large percentage of DLA inventory is affected by this type of behavior. Cluster buying skews results, suggesting that many items experience regular activity when the exact opposite is true. Addressing the mean time between buys is *not* the same as addressing the rhythm of buys. Understanding the philosophical differences between the two is crucial. The Sporadic Buy Index was generated in response to clustered buying and is instead used to identify DLA buying patterns.

2.1.3 SPORADIC BUY INDEX

The previous measurement of DLA buying behavior, the mean time between buys, was misleading because it failed to account for the repetitiveness of buys *over time*. A new measurement, the Sporadic Buy Index, is a better indicator of DLA buying behavior.

Sporadic Buy Index = Expected Days Between Buys - Mean Time Between Buys

where

Expected Days Between Buys = Days in Time Period/Number of Buys

Mean Time Between Buys = SUM(Award Date - Previous Award Date)/Number of Buys

The index is sensitive to sporadic buying patterns. A low index indicates an evenly distributed buying pattern. A high index indicates an unevenly or sporadically distributed buying pattern and suggests that clustered buying has occurred. Figure 2-5 illustrates the difference between the values generated for the mean time between buys, the expected days between buys, and the Sporadic Buy Index.

SPORADIC BUY INDEX EXAMPLE CALCULATIONS

- Time Period from 1 Oct 91 - 28 Feb 95
- Assume NSN has 3 awards: on 94001, 94010, and 94011
- Mean Time Between Buys =
  AVERAGE(Award Date - Previous Award Date)
  = ((94010 - 94001) + (94011-94010)) / 2 = 5
- Expected days between buys = # Days in time period / # Buys
  = 1210 / 3 = 403.3
- Sporadic Buy Index = Expected - Mean = 403.3 - 5 = 398.3

Figure 2-5. Measurement of Mean Time Between Buy, Expected Days Between Buys and Resulting Sporadic Buy Index

As shown in the example, the mean time between buys is misleading and generates a value of 5 days. The Sporadic Buy Index presents a more accurate picture of the clustered buying behavior of this particular NSN, indicating a high value of slightly more than 398.

2.1.4 SPORADIC BUY INDEX RESULTS

Sporadic Buy Indices were generated for stocked and DVD buys for all commodities except medical, fuels and subsistence items. Indices were generated for the two different but equal time periods, 3 May 88-31 Sep 91 and 1 Oct 91 - 28 Feb 95. These time periods were compared to determine if NSN buying behavior changed over time.

Consider DCSC buying behavior between 3 May 88 - 31 Sep 91. Figures 2-6 and 2-7 indicate that the overwhelming majority of Stocked and DVD items with two or less buys during this 3+ year time period have a high Sporadic Index, indicating erratic buying patterns. At the same time, NSNs with three or more awards per year have less sporadic buying patterns. *These findings were consistent for both time periods for all stocked and DVD commodities.* Distributions for all of the ICPs (except Medical and Fuels) are found in Appendix B.

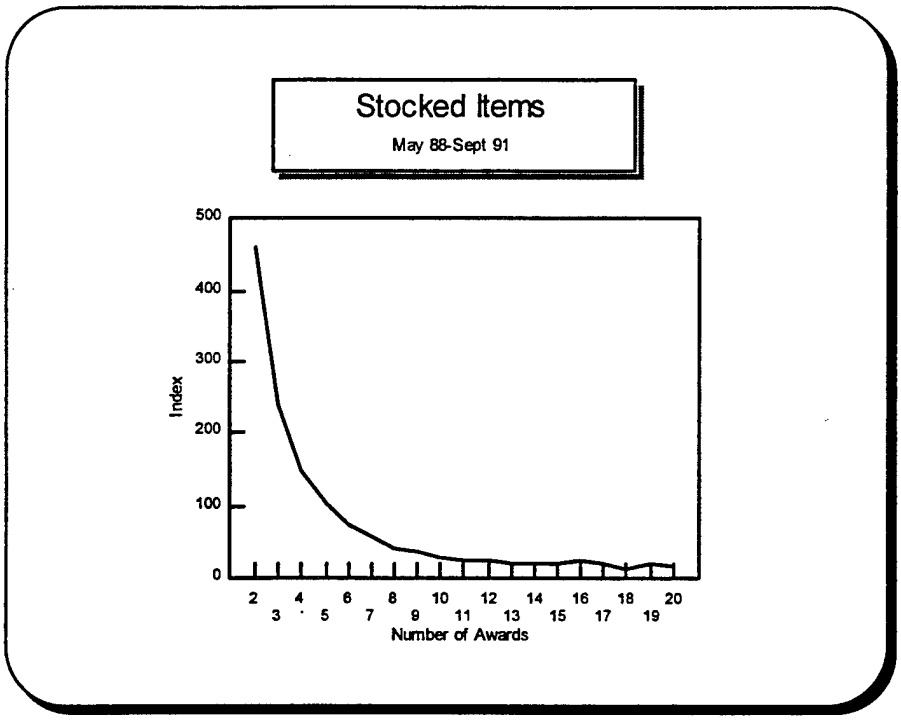

Figure 2-6. Sporadic Buy Index for DCSC Stocked Items: 3 May 88 - 31 Sep 91

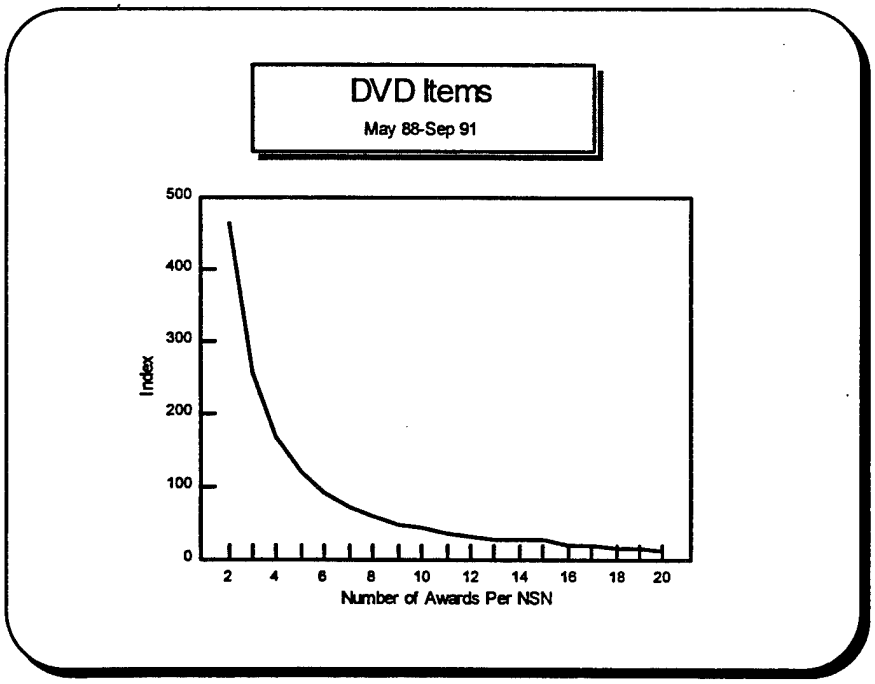

Figure 2-7. Sporadic Buy Index for DCSC DVD Items: 3 May 88 - 31 Sep 91

Comparisons between the two time periods were analyzed and no significant differences were observed. This observation further reinforces the knowledge that cluster buying is indicative of DLA buying behavior over extended periods of time.

2.2 INFLUENCE OF DATA ON MARKET BASKET APPROACH

Several of the issues discussed in the previous sections directly influence the development of the Market Basket study. That is, Market Basket measurements must address issues affecting DLA purchasing activity. Decisions made relative to the study must account for:

PROBLEM: Small number of NSNs with procurement activity in a single year

SOLUTION: Increase number of years to search for more contract information

PROBLEM: Large number of items experiencing "cluster" buys

SOLUTION: Accommodate varying levels of NSN activity by identifying different levels of performance ranging from active to less active items

2.2.1 PRELIMINARY DATA ANALYSIS IN HINDSIGHT

Preliminary data analysis provided it's greatest contribution after the Market Basket results were generated. As questions came up, preliminary data analysis supported all decisions that were made relative to the Market Basket approach and methodology. Specifically, questions were raised about the time period that was measured in the Market Basket study. Would the outcome be affected if a different time period was chosen? And, would choosing a different time period increase the level of contract data available? As has already been stated, the two different time periods exhibited similar procurement behavior. In addition, the amount and behavior of contract data does not appear to change with time. Preliminary data analysis was instrumental in bolstering the confidence of the results generated by the Market Basket study.

SECTION 3
MARKET BASKET METHODOLOGY

Initially, MMS and MMP wanted a single index that would determine the growth of costs associated with items sold by DLA. As shown in Figure 3-1, this composite index would track costs by service and contract type and allow for potential areas of improvement to be identified.

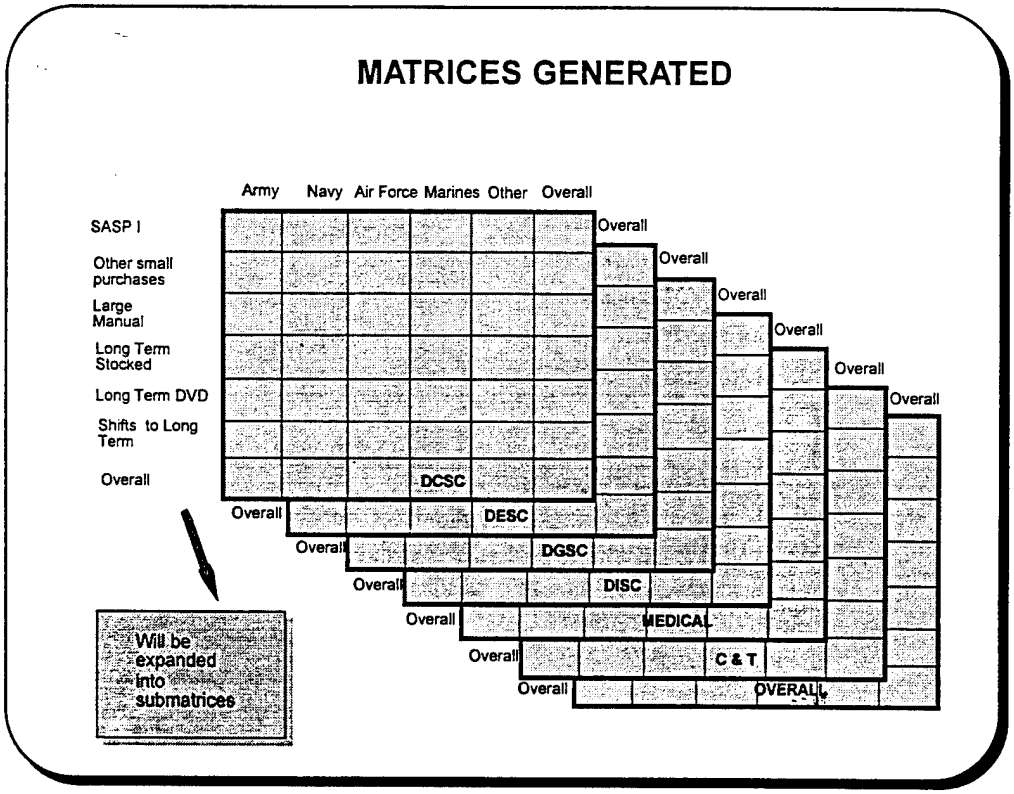

Figure 3-1. Initial Market Basket Layout

While this approach had the merit of simplicity, several shortcomings prevented implementation. Experience showed that NSNs are bought under different contracting methods, in different years, and at different prices. Yet any of these items can be issued from inventory in a given fiscal year. Stock procured in different years is indistinguishable. Consequently, customer prices are set using representative costs. In response to this obstacle, DORO developed two different sets of indices that distinguish between the price of goods sold and their material costs. Separate indices eliminate the need to be concerned with which inventory was actually sold by accomodating for the lag that occurs between the buying and selling of DLA items.

The two measurements that track DLA performance over time are the Demand-Based Indices and the Contract-Based Indices. The Demand-Based Indices are customer-oriented and emphasize demand generated by the military services and other governmental agencies. These indices provide information on the price paid by DLA customers. The Contract-Based Indices, on the other hand, focus on the procurement prices paid by DLA for items over time and examine the contract price of material. Indices are available by contract type, demonstrating the impact of different acquisition support methods and the effects of DLA Buy Response initiatives on material costs. A separate view of material cost where support has shifted to indefinite delivery contracts is also available.

As indicated in **Sections 2.1.2 - 2.2,** a large percentage of DLA inventory is not consistently bought over time. DLA's inventory must also be managed in such a way to account for and be responsive to uncertain demand generated by many NSNs. As a result, several versions of the Demand and Contract-Based Indices are developed according to different levels of demand and/or procurement activity. This iterative approach accomodates the behavior of the data by assessing the impact of several hundred thousand less active items to items with demand and/or buying activity each year. First, indices are generated for a large population of NSNs. Next, smaller groups that exist within the large population are identified according to increased buying or demand patterns. Indices associated with each iteration allow for comparisons based on different levels of activity.

3.1 DEFINITIONS AND CONCEPTS

The fundamental principles of the Market Basket approach are similar to those used to index inflation. To index inflation, prices for the same set and the same amount of items are compared over time. Quantity is held constant. By holding the quantity constant, all increased material outlays are attributed to price growth. If both quantity and cost are allowed to vary, cost cannot be isolated to either price *or* quantity.

In order to compare prices from year to year, a "market basket" of items must first be selected. In the consumer market, the market basket of items may be made up of milk, cheese and eggs. In DLA, the market basket is instead composed of bolts, medals, steel beams, etc. Even though the items found in a supermarket are different from those items found in DLA warehouses, the concepts can be applied equally.

There are two viewpoints in tracking "costs". One is from the customer's perspective and the other from the buyer's point of view. The contract unit price (CUP) is the acquisition cost that DLA pays for an item. The standard unit price (SUP) is the price the customer pays for the same item. The SUP includes the acquisition cost plus a mark-up to recover DLA operating costs . Comparisons between prices are typically made over a period of years in order to observe price trends. Trends are then identified by indexing prices on the "market basket" of items from year to year and identifying how much more or less customers are paying for the same "market basket" of items over time.

3.2 ANNUAL AVERAGE CONTRACT UNIT PRICE

Items in the "market basket" may be bought by DLA several times throughout the year. When several purchases are made, a weighted average technique is used to generate an annual average contract price for each NSN (see Figure 3-2). Weights are based on actual contract quantities so larger buys contribute more to the annual price than smaller buys. For the Demand-Based Indices, all of the buys for a NSN within a fiscal year are aggregated into a single contract price for that item, even if the item is bought with more than one contract type. To produce an annual cost for the Contract-Based Indices, buys are rolled up by contract type by NSN within a fiscal year. Items procured by more than one contract type per year generate an annual price for each contracting method.

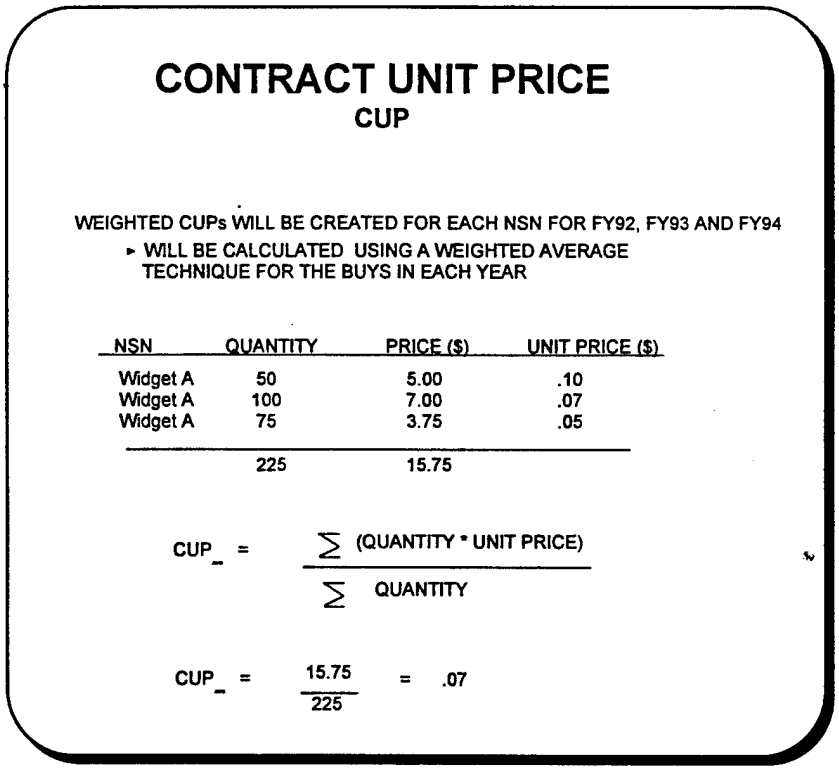

Figure 3-2. How To Generate An Annual Average Contract Unit Price

3.3 MARKET BASKET QUANTITY AND INDEXING METHOD

Once the annual average contract price has been generated for each NSN, comparisons between the out years and the base year can then be made. The base period acts an anchor, a point in time to which other periods are referenced. In this study, the base year is FY92. NSNs are evaluated by comparing changes in contract and standard prices that are multiplied by a given "market basket quantity". The "market basket quantity" is determined by a demand or the number of contract buys generated in the base year.

Figure 3-3 calculates a demand-based index for a three year period. Contract and standard prices are first multiplied by demand generated in the base year. Next, extended values are generated for each successive year. Indexes (i.e., comparisons between the years) are obtained by dividing each successive year's value by the base year value. Values that are generated are essentially percentage points, where increases or decreases are based on variation from the value in the base year.

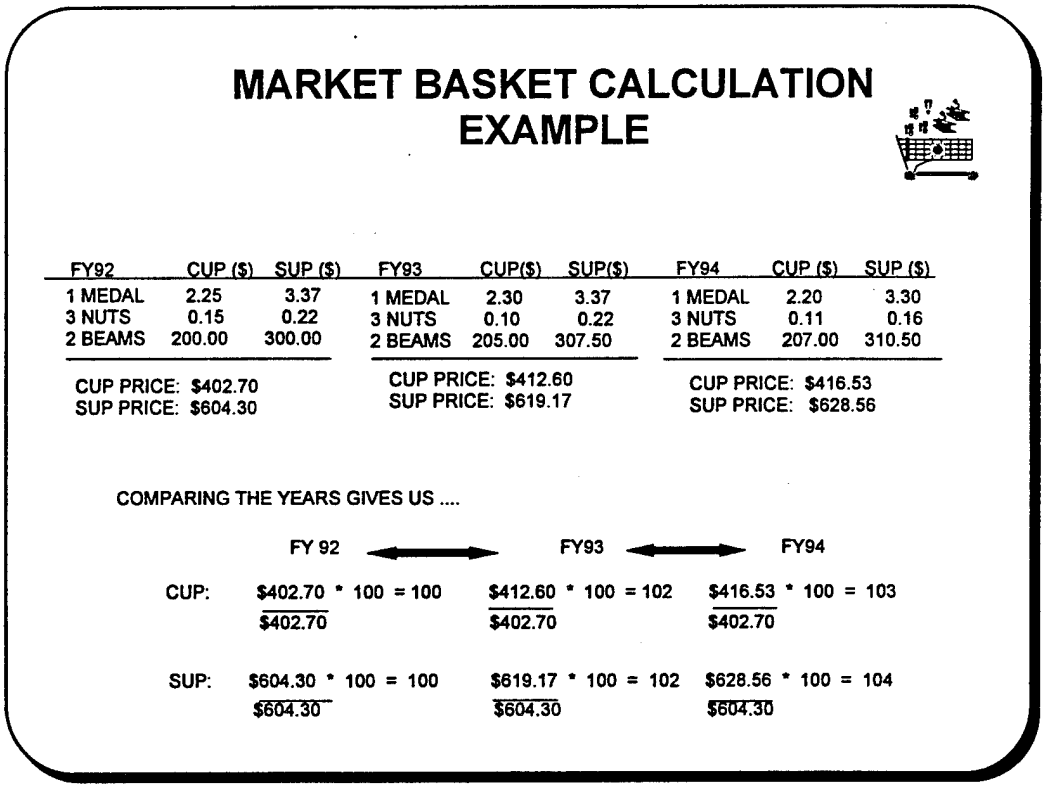

Figure 3-3. An Exampe Using The Market Basket Methodology

The "market basket quantity" must be held constant in order to isolate and measure movements in price. In reality, the demand and/or number of contract buys that are represented by "market basket quantity" vary from year to year. Therefore, the quantity that is used in the model is not the actual value of demand and/or contract buys in FY93 and FY94. However, the trade-off is necessary to produce an index. Choosing a base year that is "representative" of DLA activity minimizes the effect of the approach.

3.4 BASE YEAR: SELECTION AND COMPOSITION

The base year identifies a list of NSNs that will form the foundation for future measurements. NSNs on this list are the only items that are evaluated and must exist in order to contribute to the index. Items are identified from the following periods:

Base Year for Demand-Based Indices:	Demand in FY92
Base Year for Contract-Based Indices:	Contract Buys, FY90 - FY92

DEMAND-BASED INDICES: Several fiscal years were automatically ruled out when trying to identify the best base year. In FY88, DLA changed the way surcharge was passed on to its customers. To avoid mismatching surcharge methods, the study does not use data before FY88. The buildup to Desert Storm and the war itself occurred between FY90-FY91, and unusually high demands such as those experienced during Operation Desert Storm do not represent typical behavior. Therefore, the period is not "representative". Although demand associated with a more current fiscal year may also be more "accurate" of present day demand and/or contract buying activity, there is a trade-off. Selecting a more current fiscal year limits the number of years that can be indexed. All of these decisions pointed to FY92 as the best and earliest choice for a base year.

CONTRACT-BASED INDICES: Selection of the base year for the Contract-Based Indices is driven by many of the same reasons outlined above. However, the Contract-Based Indices face additional obstacles. Preliminary data analysis points out that a significant portion of DLA items are not bought every year (see **Subsection 2.1.4**). If the base year is restricted to only items with buys in FY92, many items with longer buying or off-year cycles would automatically be dropped from further analysis. Dropping these items unnecessarily restricts the population. Due to the limited "market basket" of items that are bought in a single year, the base year was expanded to include a wider population of NSNs. Therefore, the base year becomes a base period and items are identified from a three year interval, FY90-FY92.

3.5 BASE YEAR: SELECTION AND COMPOSITION OF PROCUREMENT DATA

To be included in the Market Basket, each NSN must have a contract unit price and a standard unit price. Since contracting information for items is not available each year, an NSNs most current procurement information is obtained from the following periods:

Procurement Data for Demand-Based Indices: Contract Data from FY88 - FY92

Procurement Data for Contract-Based Indices: Contract Data from FY90 - FY92

DEMAND-BASED INDICES: Several reasons justified expanding the base period to a five year period. Previous data has demonstrated that DLA buys only a small fraction of its inventory every year and that the vast majority of DLA's inventory is bought sporadically (see **Section 2.1**). Yet DLA still sells stock items somewhat independent of the buy cycle and contract price. The main purpose of the demand-based portion of the study is to measure changes in standard price since this is the price the customer pays for items. Limiting the population based on contracting activity to a single year unnecessarily and illogically shrinks the items under consideration. The large five year window overcompensates on the side of safety by initially allowing for a large population that is eventually narrowed down. If contract prices are not available within a five year period, the item is dropped. The following examples clarify this point.

Item bought in FY88, FY89, FY90, FY91, FY92: Use FY92 contract information

Item bought in FY88, FY90: Use FY90 information

Item bought in FY87: Drop item

Item bought in FY93: Drop item

CONTRACT-BASED INDICES: The size of the "window" searched for procurement data is different for the Contract and Demand-Based Indices because of the varying nature of the objectives sought by each. The Contract-Based Indices measure the change in material costs of a group of items over time. Indices are driven by units bought instead of units demanded. Therefore, greater emphasis should naturally be placed on those items with heavy procurement activity, irrespective of demand. For the Contract-Based Indices, an item's most recent contract price is obtained over a three year period. Again, the smaller three year window overcompensates on the side of safety by initially allowing for a large population that is eventually narrowed down. If an item was purchased more than three years from the base period, then the item does not contribute to the indices. The following process clarifies item selection.

Item bought in FY90, FY91, FY92: Use FY92 information

Item bought in FY90, FY91: Use FY91 information

Item bought in FY93: Drop item

NOTE: All contracting actions that *have been awarded* contribute to the annual average contract price for a particular NSN. Buys have not been removed for cancelled contracts. Their effect is minimal and inclusion is justified because the contracting action represents the price that DLA **had negotiated and would have paid** for that part.

SECTION 4
DEMAND-BASED INDICES

The Demand-Based Indices generate contract and standard price values that are **weighted by demand** generated in the base year. Due to the weighting approach taken, the index provides a measure of the price the customer pays for items. Items are not weighted equally. High dollar items with increased demand contribute more to the index than lower dollar items with small demand.

4.1 DEMAND BASED ITEM SELECTION AND MATRIX LAYOUT

Indices provide measurements by service and ICP. Service categories are broken down into the following groups: Army, Navy, Air Force, Marines and Other. The category 'Other' refers to other federal agencies and governmental entities. The ICPs are separated by center (DCSC, DESC, DGSC, DISC), by hardware ('HARD') that has been added to consolidate the performance of DCSC, DESC, DGSC and DISC into a single value, and by C&T (all hereafter referred to as ICP). Information is provided in the following format:

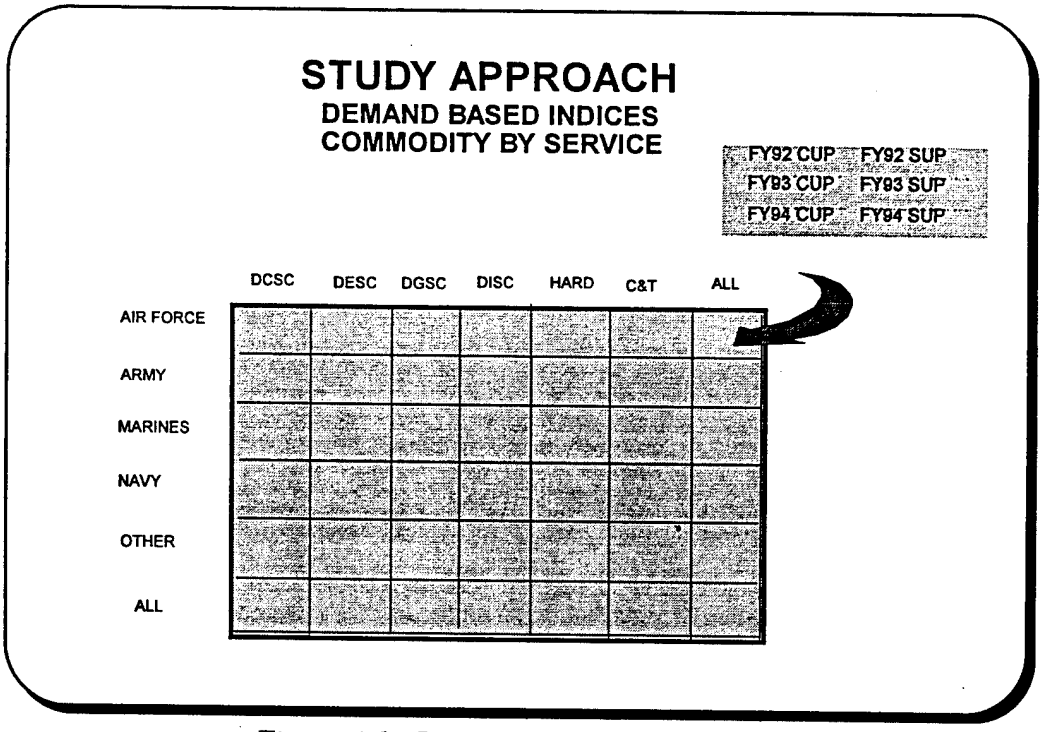

Figure 4-1. Demand-Based Matrix Layout

- Every cell within the matrix represents a different "market basket" of goods and generates its own set of indices for the base year and out years. Information is cumulatively broken out to provide indices for specific combinations of service and ICP. Three different views of DLA behavior are available. On the smallest scale, the indices track the interaction between a service category and a single ICP. For example, the uppermost left corner cell, 'Air Force by DCSC', provides measurements on the behavior of all construction parts purchased by the Air Force. At the next level, the 'ALL' row and column categories, located on the bottom row and extreme right hand column, "roll up" information across the respective ICP columns and/or service rows. These cells eliminate the smaller breakouts by aggregating information by service or ICP. The largest aggregation is the 'ALL ALL' cell, located in the bottom right-hand corner, which provides information on all of the items in *entire* the market basket. The "ALL ALL" cell is **not** calculated by averaging row and column cells. Instead, indices are recalculated using the entire population of items within the matrix. For example, if a population consists of 400,000 items, each NSN contributes a share to the total based on its price and demand generated in the base year.

On a final note, each cell provides information on both contract unit price and standard unit price (i.e., the CUP and SUP value) growth. However, contract prices *for the Demand-Based Indices* are deemed to be of less importance since these numbers are less responsive to change. Reasons supporting this position are outlined in **Section 4.2.**

4.2 VARIATIONS TO DEMAND BASED INDICES

For an item to appear in the Demand-Based Index, an item must have a demand in FY92 and a contract buy between FY88 and FY92. That is, an item's most recent contracting information is obtained over a five year period while standard prices are restricted to a single year (as discussed in **Section 3.4.1**) For each case, non-recurring demand is excluded from analysis. Government Furnished Material (GFM) contracts are dropped since items are not sold to DLA customers. NSNs with unit of issue changes are also set to the previous standard or contract unit price before the issue change occurred. Indices are generated for two different cases:

Unrestricted: Buy between FY88-FY92. Demand in FY92

Restricted: Buy between FY88-FY92. Demand in FY92, FY93 and FY94

The 'Restricted' case provides a better view of the behavior of more active items. The following table outlines how the Demand-Based Indices are affected by the two different runs:

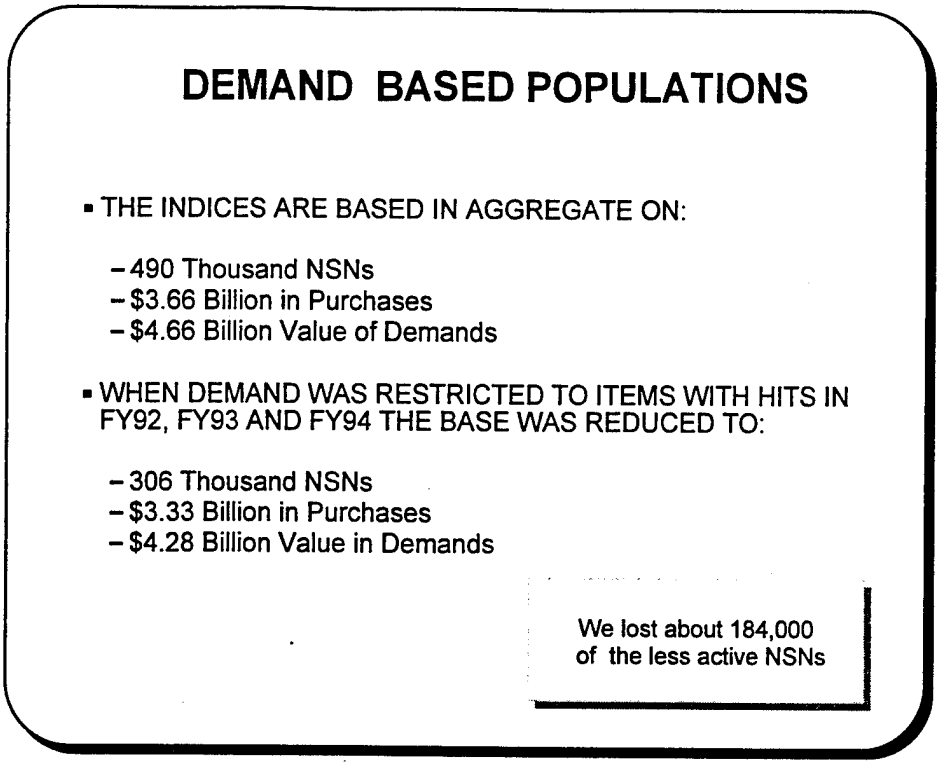

Figure 4-2. Comparison Of Demand-Based Indices (Dollars Are For FY92)

The number of items represented in the 'Unrestricted Case' is large since any item meeting the minimum requirements can contribute to the index. Indices are based on 490,000 items that generate $3.66 billion in sales in FY92. For many of the less active NSNs in the 'Unrestricted' run, additional buys and demands never materialize so contract and standard prices can't be updated. Standard prices generally do not change for these items until another buy triggers a change in both contract and standard unit price or until an ICP changes the surcharge. Including these items in the index artificially dampens the results because prices are carried forward and never change. The dampening problem is especially prevalent for contract information (i.e., the CUP values) since so little procurement data is available. As such, results from the 'Unrestricted' Demand-Based Indices are not utilized. The 'Unrestricted' case is being addressed for purely informational reasons. To reduce the dampening effect, a second "restrictive" case was developed to identify the behavior of "more active" items.

The second variation to this iterative process reduces the 'Unrestricted' population by requiring NSNs to have demand each year. In response to this constraint, items under analysis drop by 184,000 NSNs. The aggregate dollar value of the population drops 9% based on the cost of goods sold in the base year; 8% using the selling price.

Contract information (i.e., the CUP values) for the Demand-Based Indices are heavily influenced by lack of procurement data. The process of pulling values forward to fill in the missing "gaps" affects the indices ability to respond to change in procurement costs. Additional requirements imposed on the restricted case provide more responsive SUP values, not CUP values. The CUP columns are somewhat interesting, and have been generated but deviate from the purpose of the indices. As such, information should be carefully interpreted before any conclusions are reached. As will be shown in **Subsections 4.2.1, 4.2.2 and 4.2.3**, the CUP values are relatively flat, due to the problems already stated.

4.2.1 UNRESTRICTED DEMAND-BASED INDICES

The 'Unrestricted' Demand-Based Indices reflect items demanded in FY92 regardless of demand in following years. Therefore, items with infrequent or irregular demand swell the population. The 'Unrestricted' case is used as a *starting point for further analysis*. The 'ALL ALL' market basket provides an overall assessment of item behavior. As shown in Table 4-1, over the course of three years, standard unit price measures increase 2% while contract prices indicate no movement. Although one might expect an increase in contract price, the indices are flat because of the large number of items that are sold from inventory but not bought.

The 'Unrestricted' case includes all items that meet the minimum conditions. As a result, some extreme outliers are not excluded and have significant effects on certain cells. The smaller the number of items in a cell, the more extreme the variation. Cells that represented by a small number of NSNs are unable to counteract the behavior and reduce the influence of the outlier. These cells are examined to alert the reader to potential problems that outliers cause to market basket measurements.

Outliers affect two cells in particular. The first, 'DCSC by Other', saw its standard price increase 24% between the base year and FY94. The change is mainly attributed to the particular buying pattern of a single NSN, where the base year demand dropped from 46,940 units to 17 units in FY93 and FY94. The standard price for the item was $477 in the base year and almost doubled to $879 in FY93 and FY94. Due to the weighting scheme and the small number of items evaluated in this market basket of items, this NSN significantly contributes to the 'DCSC by Other' indices and skews the results.

The other outlier occurs at the 'DISC by Army' cell. Between the third and fourth quarter of FY94 (i.e., FY943 and FY944) the standard price measure jumps 12 points. Further analysis explains the cell's behavior. Many of the items in the market basket generated no demand in FY93 or in the first three quarters of FY94. However, in the last quarter of FY94, Army sales experienced tremendous growth. Year-end buying accounts for all of the increase that occurred in FY944.

These particular outliers points out the potential problems associated with tracking items with widely varying demand. However, MMP strongly felt that leaving in the outliers was acceptable since some benefit could be gained by examining their behavior. It also appears that many are eliminated through additional requirements that are placed on the more restrictive runs. If outliers do pass additional restrictions, indices should be balanced out by the performance of other NSNs. By working at the aggregate level, the effect of a few outliers should be counteracted by the other NSNs within the market basket.

Table 4-1. COMMODITY BY SERVICE CUP AND SUP INDICES
UNRESTRICTED AS TO DEMAND IN 93 AND 94

		C		E		G		I		H		T		ALL	
		CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX
AIR FORC	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	95	102	96	101	102	87	94	97	97	103	98	98	97
	FY943	102	97	103	99	102	106	87	99	98	101	103	101	98	101
	FY94	103	98	104	99	102	106	87	99	98	101	103	101	99	101
ARMY	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	96	100	94	101	102	99	96	101	98	101	97	101	97
	FY943	103	97	101	97	101	104	99	97	101	99	100	99	101	99
	FY94	103	99	102	97	99	104	95	109	100	102	100	99	100	101
MARINE	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	99	94	98	92	100	102	98	97	99	96	101	100	100	98
	FY943	99	94	97	92	102	104	98	98	99	96	98	102	99	99
	FY94	97	94	96	92	106	104	98	98	99	96	99	102	99	99
NAVY	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	102	97	96	101	102	103	100	96	100	99	99	97	100	99
	FY943	103	100	96	101	104	106	100	102	101	102	101	96	101	101
	FY94	103	100	97	101	104	106	100	101	101	•102	101	96	101	102
OTHER	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	122	100	96	100	102	95	95	100	106	101	101	100	104
	FY943	101	124	101	101	101	104	95	105	100	110	101	104	101	107
	FY94	102	124	103	101	101	104	96	105	101	110	101	104	101	107
ALL	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	98	98	98	101	102	95	95	99	99	101	98	100	98
	FY943	102	100	99	100	102	105	96	100	100	101	101	100	100	101
	FY94	102	100	99	100	102	105	95	102	100	102	101	100	100	102

4.2.2 RESTRICTED DEMAND-BASED INDICES

The 'Restricted' Demand-Based Indices are developed using the history of only 306,000 NSNs that generate $3.33 billion dollars in sales in the base year. More than 37% of the NSNs were eliminated by requiring items to have demand each year. Indices are shown in Table 4-2. The 'ALL ALL' cell again indicates no movement in contract unit price while standard prices initially drop by 1% and then rise to 101%.

The additional restrictions have been partially successful in weeding out outliers. The most noticeable change compared to the 'Unrestricted' Case is that the unruly behavior of the 'DISC by Army' cell has been eliminated. Many of the items that skewed the indices had no demand in FY93 and are eliminated from further analysis. However, the influence of a single NSN is still driving the 'DCSC by Other' cell.

Another interesting aspect to the 'Restricted' Indices suggests that a time lag exist between changes in acquisition and customer costs. Experience suggests that the time lag may vary from one to three years. In a few cells, especially at DCSC, the contract prices are increasing while the standard prices are decreasing. One possible explanantion is that improvements in the acquisition process and streamlining efforts can reduce overhead costs passed on to the customer.

Table 4-2. COMMODITY BY SERVICE CUP AND SUP INDICES
RESTRICTED AS TO DEMAND IN 93 AND 94
(NSN BY SERVICE)

		C		E		G		I		H		T		ALL	
		CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX
AIR FORC	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	96	101	95	101	102	86	94	96	97	103	98	98	97
	FY943	103	98	103	98	102	106	86	99	97	101	103	101	98	101
	FY94	103	98	105	98	102	106	86	99	97	101	103	101	98	101
ARMY	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	96	100	94	101	102	99	96	100	97	101	97	101	97
	FY943	102	97	101	96	101	105	99	96	101	99	100	99	101	99
	FY94	103	97	102	96	99	105	95	96	100	99	100	99	100	99
MARINE	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	98	94	98	91	100	102	98	96	99	96	101	100	100	98
	FY943	99	92	97	92	102	104	98	97	99	96	98	102	99	98
	FY94	97	92	90	92	106	104	97	97	98	96	99	102	98	99
NAVY	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	102	97	96	101	102	103	100	95	100	99	99	97	100	99
	FY943	103	99	96	102	104	106	100	101	101	102	101	96	101	102
	FY94	103	99	97	102	105	106	100	101	101	102	101	96	101	102
OTHER	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	128	100	96	100	102	94	95	99	108	102	101	100	105
	FY943	101	129	101	100	101	104	94	100	100	110	102	105	101	108
	FY94	102	130	102	100	101	104	94	100	101	111	101	105	101	108
ALL	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	98	98	98	101	103	95	95	99	98	101	98	100	99
	FY943	102	100	98	100	103	105	95	99	100	101	101	100	100	101
	FY94	102	100	99	100	102	105	94	99	100	101	101	100	100	101

SECTION 5
CONTRACT-BASED INDICES

The Contract-Based Indices generate measurements that are **weighted by the number of units bought** in the base period. Because of the indexing approach, the study produces comparisons of the change in material cost paid by DLA. Items are not weighted equally. Items with higher buy quantities and higher contract prices contribute more to the index than items with smaller buy quantities and lower contract prices.

5.1 ITEM SELECTION AND MATRIX LAYOUT

Measurements are provided by contract type and ICP. Contract categories are broken down into the following groups:

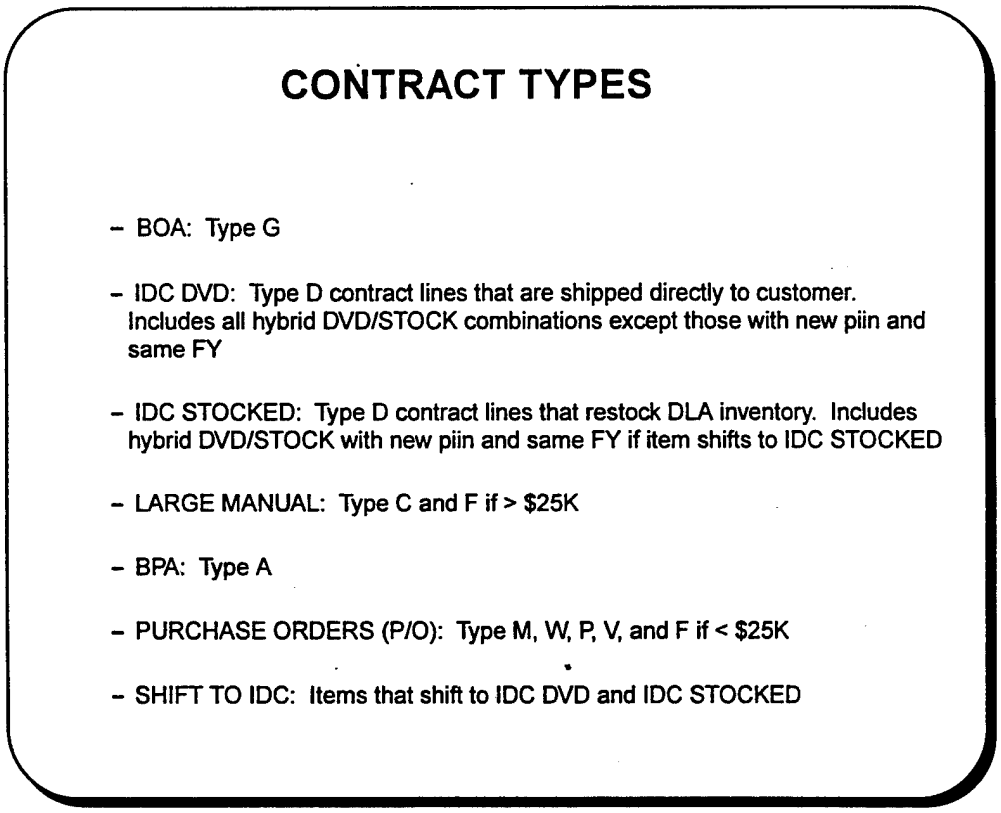

Figure 5-1. Definitions Of Contract Types

The ICP categories are DCSC, DESC, DGSC, DISC and C&T. A hardware category ('HARD') is also provided that consolidates the performance of DCSC, DESC, DGSC and DISC into a single measurement. Information is provided in the following format:

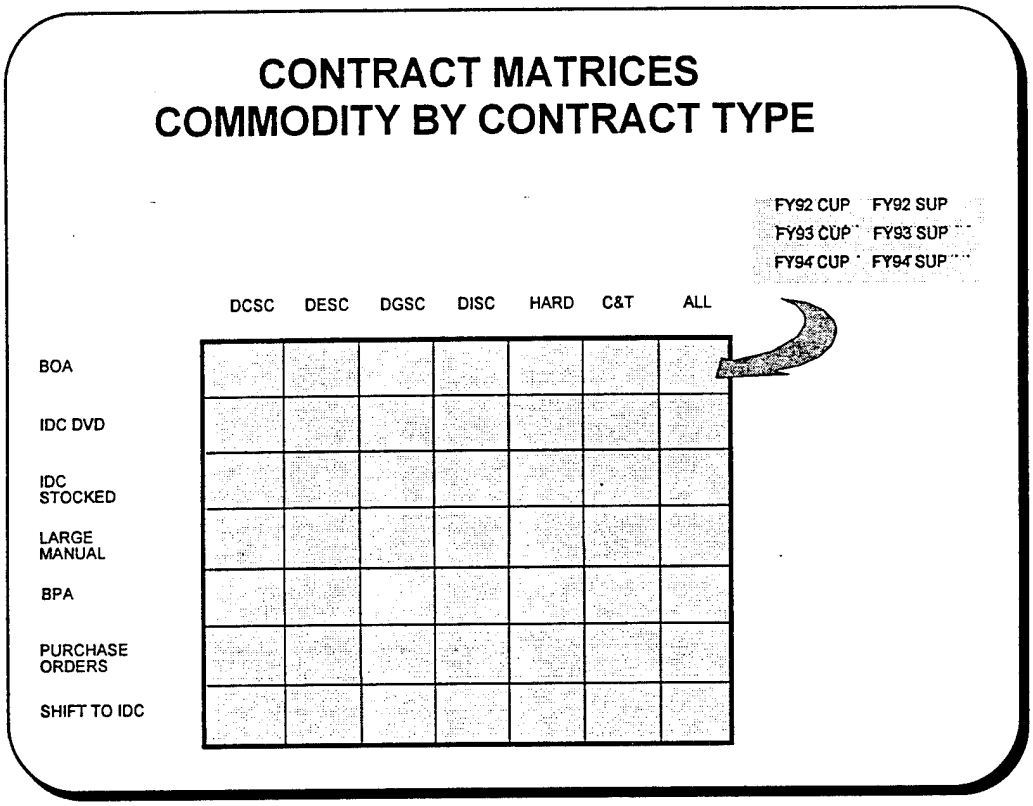

Figure 5-2. Contract-Based Matrix Layout

Every cell within the matrix represents a different portion of market basket of goods that are bought. Each cell generates it's own set of measurements for the base period and out years, where indices are provided for specific combinations of ICP and contract type. The table layout is similar to the format described for the Demand-Based Indices. For further information, refer to **Section 4.1.**

The largest aggregation of information is the 'ALL ALL' cell, located in the bottom right-hand corner. Measurements include all of the items in *entire* the market basket. The 'ALL ALL' cell is **not** calculated by averaging row and column cells. Instead, cell values are recalculated using the entire population of items within the matrix. For example, if 80,000 items are being evaluated, each NSN will contribute a share to the total based on its price and units that are bought in the base period.

On a final note, each cell provides information on both contract unit price and standard unit price (i.e., the CUP and SUP value) measurements of growth. However, the standard prices or SUP values that are generated for the Contract-Based Indices are deemed to be of less importance . Reasons supporting this position are outlined in **Section 5.2.**

5.1.1 IDENTIFICATION OF CONTRACT CATEGORIES

For items to appear in specific contract categories, NSNs must consistently be procured by the same contracting types between the base year and FY94. Information on contract types that do not appear in the base year are not included unless the support shifted to Indefinite Delivery Contracts (IDCs). Shifts to IDCs are allowed in order to measure rates of change in material cost associated with the movement of items to long term contracting arrangements. The degree of variability of procurement methods *by NSN* directly affects the amount of contract data that can be used. As a result, *all* of the different combinations of contract types, by NSN, that occurred between the base year and FY94 were identified.

As shown in Figure 5-3, contracting history was identified at the NSN level, sorted by award date, and then condensed into a single record that identified the item's contracting behavior over time. This particular NSN is initially bought under Purchase Orders and then changes to Large Manual procurement. The record that's generated identifies the contract behavior of the NSN as a "Purchase Order, Large Manual".

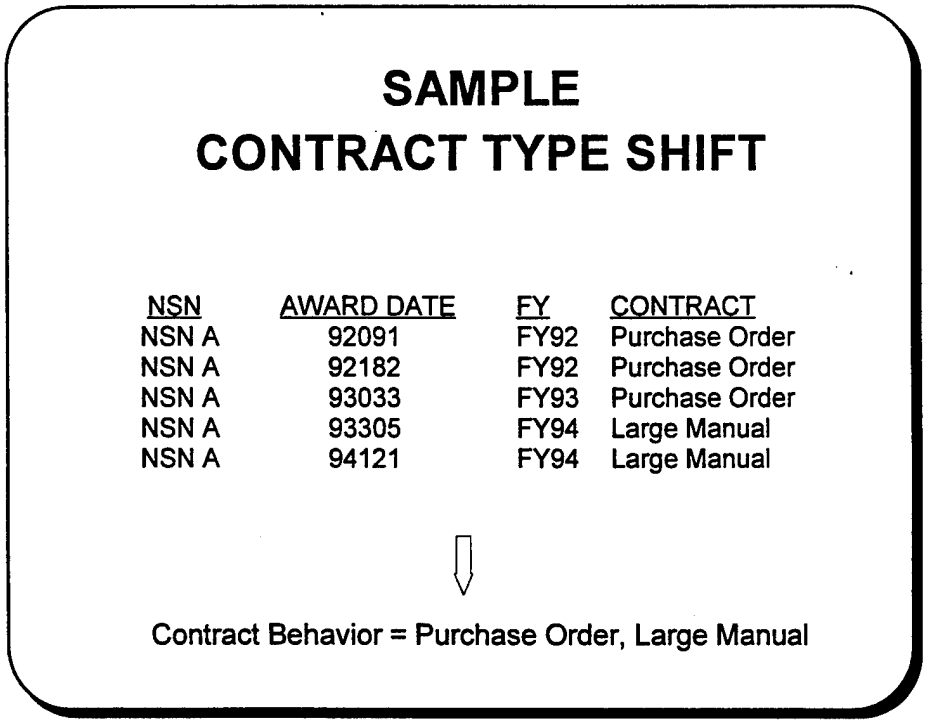

Figure 5-3. Identifying Contract Behavior

Contract behavior (i.e., "Purchase Order, Large Manual") for all of the NSNs under evaluation in the 'Unrestricted' case were identified, sorted and counted. Frequencies were generated to identify the degree of accuracy of the procurement categories that have been chosen. If the contract categories exclude significant portions of data, then the categories should be revised.

The frequencies indicated that large groups of NSNs were routinely procured by the same type of procurement methods and were captured under the existing contract categories. Therefore, the contract groupings listed in Figure 5-2 are valid. The detailed analysis of contract types and shifts between contract types revealed that less than 10% of cost history was dropped for the 'Unrestricted' case. The vast majority of shifts (except in the case of DVD or Stocked items) occurred in three distinct groups: Large Manual and Purchase Orders, BOA and Purchase Orders, and BPAs and Purchase Orders. Since items that shift between these categories (e.g. BPA to Purchase Order and vice versa) do so constantly and without consistent behavior, we decided that little insight could be gained in tracking these and dropped them from consideration. The contract combinations also pointed out that certain NSNs bounce back and forth between the DVD and Stocked categories. For example, NSNs such as film are bought under either group, according to need.

Two separate IDC categories were created to target items that move back and forth between DVD and Stocked procurement methods, as well as to accomodate items that are consistently bought under the same IDC arrangements. Rules were made to target the NSNs that move between the two methods to be identified by a single category, either 'IDC DVD' or 'IDC Stock'. For these items, it is assumed that NSNs are 'IDC DVD' items and will *only* be counted as 'IDC Stock' if certain events occur. An item that jumps categories will only be considered 'IDC Stock' if a shift occurs from an 'IDC DVD' to an 'IDC Stock' category within the same fiscal year. The rationale is that such a move constitutes a conscious decision by commodity managers that the NSN is best procured as a stocked item. It is further assumed that an item will remain in either the DVD or Stocked category once the move to long term contracting occurs.

5.1.2 SHIFT TO INDEFINITE DELIVERY CONTRACTS (IDCs)

In the past few years, DLA has continued to emphasize the preference for IDCs. DLA has encouraged and supported the ICPs, where possible, to shift from other contracting methods to the procurement of items by IDCs. The 'Shift to IDC' category supports this policy by targeting items that have migrated from another category into IDC arrangements. Items can migrate during the base period or in the out years. An item will not appear in the 'Shift to IDC' category if the first buy in the base period is a long term contract. The item would instead be measured in the 'IDC DVD' or 'IDC Stock' basket. An item only appears if the first buy during the base period is something other than an indefinite delivery contract.

Up to this point, all of the indices that have been previously discussed do not differentiate between the material cost performance of items that migrate to different forms of IDC contracts (i.e., 'IDC DVD' and 'IDC Stock' categories). This differentiation is accomplished through 'Shift to IDC' subanalysis. Items from the 'Unrestricted' contract population are used to identify the NSNs that can be evaluated. As seen in Figure 5-4, the base period can be composed of multiple contract types since NSNs can "shift" anytime during *either* the base period or the two out years. As time progresses, more and more NSNs in the basket migrate. By FY94, all items in these categories have shifted from other categories into long term arrangements.

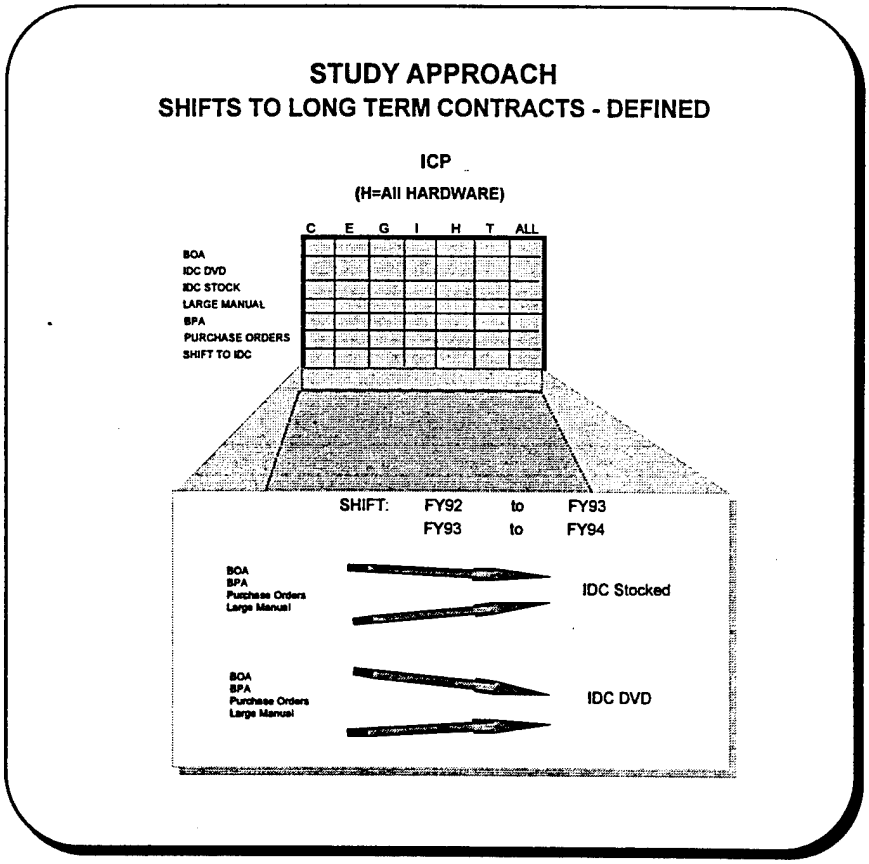

Figure 5-4. Composition Of Items That Are In The "Shift To IDC" Category

Once all of these items have been identified, indices can then be generated (see Figure 5-5). Indices for the 'Shift to IDC' category are provided in a format similar to the table layout used for Demand and Contract-Based Indices. For further information on table construction, see **Sections 4.1 and 5.1.**

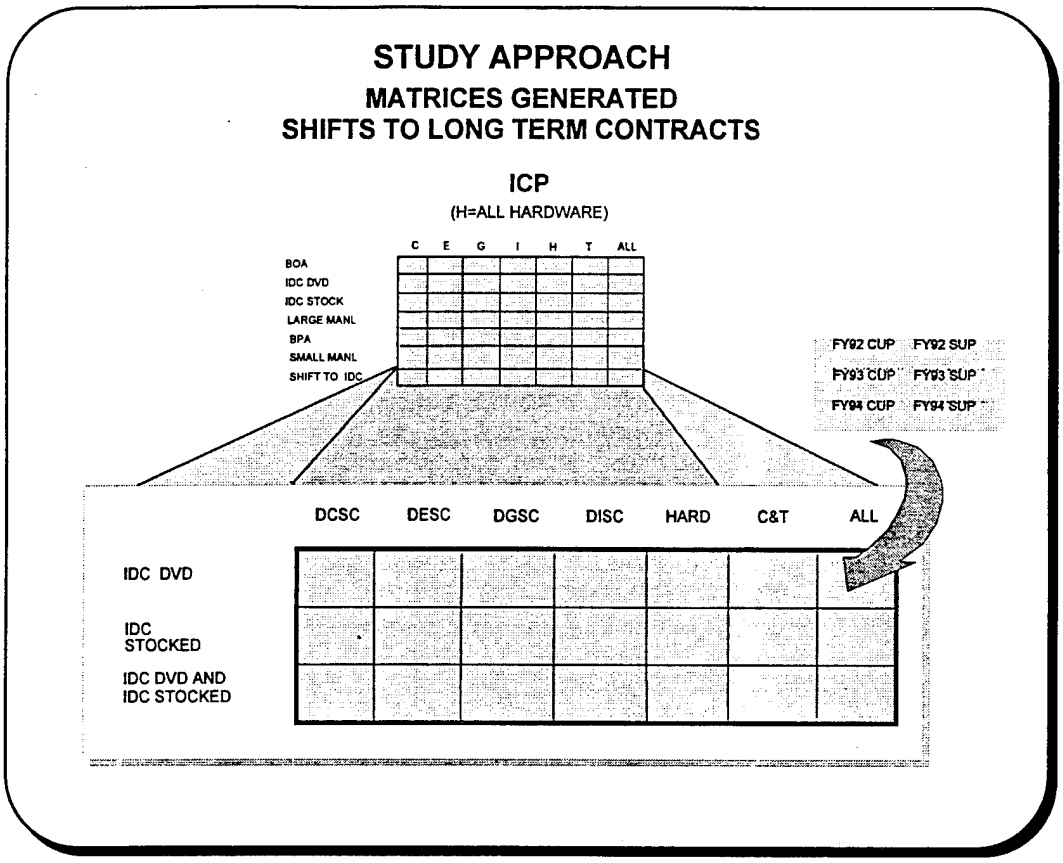

Figure 5-5. Matrix Layout Generated By The "Shift To IDC" Category

5.2 VARIATIONS TO CONTRACT-BASED INDICES

For an item to appear in the Contract-Based Index, an item must have a contract buy between FY90 and FY92. An item's *most recent contracting information* is obtained from a single year during this three year time period. If buying activity does not occur in a given year, values are "pulled forward' from a previous year to fill in missing information. Until a new purchase is made, the material cost for items does not change. GFM contracts are also dropped and NSNs with unit of issue changes are set to the previous contract or standard price before the issue change occurred. Indices were generated for three different cases:

Unrestricted: Buy in base period (FY90-FY92)

Restricted 2 out of 3: Buy in base period and at least FY93 or FY94

Restricted 3 out of 3: Buy in base period, FY93 and FY94

The first iteration to the Contract Based Indices is the 'Unrestricted' case. Two step-wise variations reduce the amount of information analyzed by gradually applying more restrictions. As the restrictions increase, the population shrinks. The restricted indices provide more responsive measures of the change in material cost since items are limited to those with more procurement activity. Figure 5-6 outlines how the Contract-Based Indices are affected by the three different test cases:

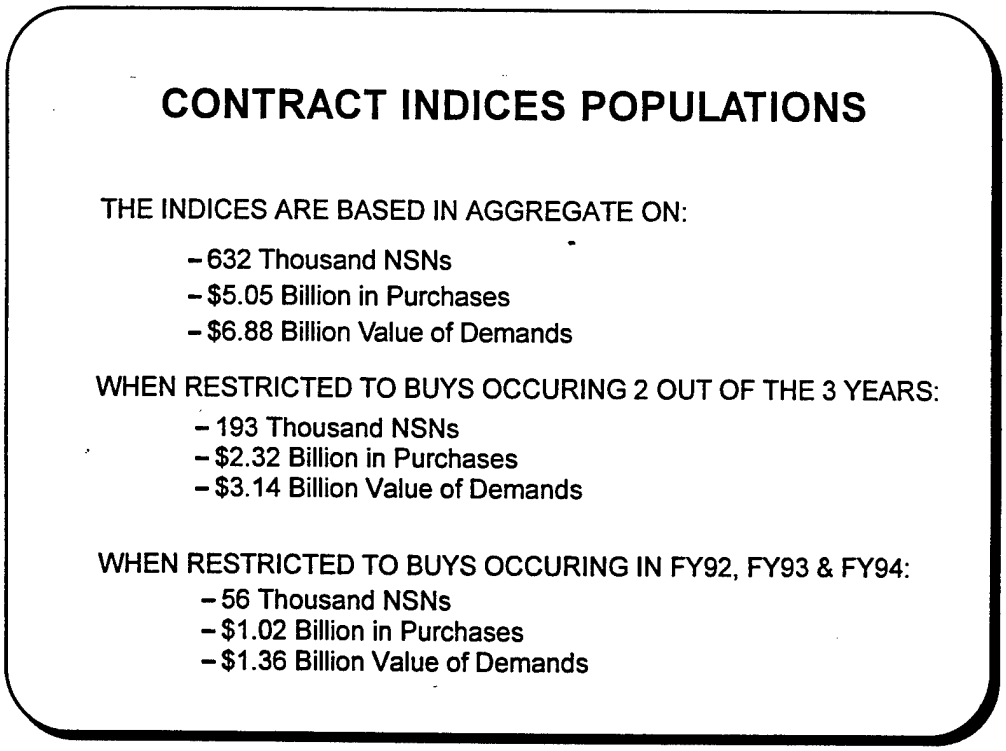

Figure 5-6. Comparison Of The Contract-Based Indices (In FY92 Dollars)

The 'Unrestricted' Contract indices are based on 632,000 NSNs with a purchasing activity of $5.05 Billion. DLA's actual annual materiel obligation for the five commodities in the study group is approximately $2.5 billion. The Market Basket's 'Unrestricted' case is larger because the base period incorporates a NSN's most recent contract information from a three year period. Just as in the 'Unrestricted' case for the Demand-Based Indices, results from the 'Unrestricted' run are not briefed. As restrictions are placed on the NSNs, the pool of items under evaluation shrinks. Each of the two additional runs represents more "active" items with increased contract activity.

The second step-wise variation is the 'Restricted Two out of Three' case. The additional requirement that an NSN have a buy in FY93 and/or FY94 reduces 70% of the NSNs under consideration. Indices are now based on 193,000 NSNs with a purchase price of $2.32 Billion. The indices are becoming more indicative of DLA behavior since the population is limited to items that experience increased levels of buying activity. However, these indices are still not particularly useful because of the variation of the time between buys.

The last variation is the 'Restricted Three out of Three' case. Items under evaluation drop to 56,000 as NSNs are required to have contract buys each year. The population is valued at $1.02 billion or about half of DLA's *actual* annual buys of the commodity groups under evaluation.

Even though DLA has an enormous inventory, few items are routinely bought as seen from preliminary data analysis. Obviously, items with buying cycles longer than a year account for a significant portion of DLA inventory. The Contract-Based Indices are more of a leading edge indicator since standard prices associated with the Demand-Based Indices may take anywhere from 1 to 3 years to be updated. The Contract-Based Indices suggest how well DLA is able to negotiate materiel costs for required items while the Demand-Based Indices suggest the price that customers are paying for the same set of goods over time. Many items experience little demand or are hard to obtain, but must be available to a customer when required. The size and diversity of items that can be demanded and the need to be stocked creates for an enormous inventory. Once DLA 'eats down' it's inventory, more purchases will be required to meet demand. DLA expects to satisfy these requirements largely by IDC DVD contracts. Currently, DVD buys account for a third of the *actual* total dollars associated with DLA annual procurement. In the Market Basket study, IDC DVD purchases account for half of the dollars for buys associated with the 'Restricted Three out of Three' case. In addition, the 'Restricted Three out of Three' Indices are based on frequent procurement activity. Contract information for the 'Unrestricted' and 'Restricted Two out of Three' Contract-Based Indices are heavily influenced by absence of buys for time periods or extreme variations in quantities that are purchased. The process of pulling values forward to fill in the missing "gaps" influences the indices ability to respond to change in procurement costs. Additional requirements imposed on the most restrictive case provide the most responsive CUP values, providing insight on the material cost of items that are frequently acquired. As such, the 'Restricted Three out of Three' run is the best indicator of change in material costs out of the three contract-based iterations.

Information on the standard price that customers are paying for items that are procured (i.e., SUP values) is also available for all of the iterations. These SUP columns are somewhat interesting, and have been generated but deviate from the purpose of the indices. The purpose of the indices is to measure change in material cost. SUP information should be carefully interpreted before any conclusions are reached.

The Market Basket includes buys that can and do result in higher than normal prices. These buys are not eliminated and contribute to the average annual contract price for an item. If DLA purchases a particular item and pays a higher price due to a specific buying approach, then these items are rightfully included. Indices that only contain 'ideal buys' where all NSNs fall within prescribed price ranges would lead to overly optimistic results and bias the results.

5.2.1 'UNRESTRICTED' CONTRACT-BASED INDICES

The 'Unrestricted' Contract-Based Indices are calculated using 632,000 NSNs. DLA did not purchase all of these items in a single year. As such, it represents an unusually large group of items. As mentioned in Section 3.5, the three year period was chosen to accommodate longer buying cycles. Indices generated for the 'Unrestricted' run will be less responsive to changes in material cost than the remaining two runs since many prices are pulled forward to fill in missing contract data. The 'Unrestricted' indices are only used as a starting point for further analysis. The 'ALL ALL' cell indicates overall performance. Table 5-1 indicates that DLA is paying more for the items that it buys, while DLA customers are paying less for the same items. Standard prices drop 4% between the base period and FY93 and then increase 2% in FY94, while contract prices increase 4% over two years, ending at 104% in FY94.

Results from the 'ALL ALL' categories vary from the Service to the Contract-Based Indices. The 'Unrestricted' Demand-Based Indices showed no growth in materiel costs (i.e., CUP values), primarily because so many costs were carried forward for follow-on years. On the other hand, the contract measurements, even in the least restrictive case, point out that material costs are increasing 2% per year.

Table 5-1. COMMODITY BY CONTRACT CUP AND SUP INDICES
UNRESTRICTED AS TO BUYS IN 93 AND 94

		C		E		G		I		H		T		ALL	
		CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX
BOA	FY92	100	100	100	100	100	100	100	100	100	100	0	0	100	100
	FY93	101	94	101	93	103	105	102	93	102	96	0	0	102	96
	FY94	103	97	102	98	106	110	106	102	104	101	0	0	104	101
IDC DVD	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	103	95	90	95	100	102	97	92	99	97	100	99	99	96
	FY94	106	103	87	101	104	104	98	87	101	101	103	100	101	101
IDC STOCKED	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	102	93	102	92	99	102	104	95	102	96	101	104	101	98
	FY94	103	96	103	94	98	100	103	94	102	96	101	112	101	101
LARGE MANUAL	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	90	101	93	101	94	100	93	101	93	101	97	101	95
	FY94	104	92	103	96	102	100	100	99	103	97	102	98	103	98
BPA	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	99	102	95	102	105	103	103	102	101	99	101	102	101
	FY94	103	99	104	97	103	106	106	108	104	104	98	100	104	104
SHIFT TO IDC	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	89	100	92	101	100	101	91	101	93	101	104	101	98
	FY94	99	90	102	93	104	97	100	94	101	94	103	102	104	97
P/O	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	103	93	103	93	102	101	104	94	103	95	101	97	103	95
	FY94	105	95	105	96	106	105	108	99	106	98	102	101	106	98
ALL	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	102	92	102	93	101	98	102	94	102	95	101	99	102	96
	FY94	104	94	103	96	103	102	105	99	104	98	102	100	104	98

5.2.2 'RESTRICTED TWO OUT OF THREE' CONTRACT-BASED INDICES

The second variation to the step-wise process that reduces the 'Unrestricted' population is the 'Restricted Two out of Three' run. NSNs are required to have at least two contract buys, one in the base period and *at least* one additional buy in FY93 or FY94. While some contract information still must be pulled forward, the indices are starting to provide a better picture of DLA performance. They are presented in Table 5-2.

In an expanding economy, DLA expects to see that the prices DLA pays for items will increase over time. Unlike results from the Demand-Based Indices, measurements for Contract-Based Indices appear to be more reactive since they show some growth in material cost. This is due to the fact that more contracting data actually contributes to the measurements of material cost. In Table 5-2, the 'ALL ALL' indicates that contract prices are increasing at a steady 4% per year while the standard prices associated with these NSNs seem to be a bit more stable. As expected, eliminating inactive items from consideration in the 'Unrestricted' case causes contract measurements to increase. In general, contract information that is associated with the Contract-Based Indices are less influenced by dampening that occurs in the Demand-Based Indices. This is due to the indices emphasis on measuring materiel costs and the restrictions that are imposed.

The 'Restricted Two out of Three' run highlights cells that include NSNs with large swings in the quantity of items that are bought from year to year. As a result, outliers drive certain market baskets which in turn leads to higher indices. However, all of the contract categories are on the same footing and are all equally penalized by erratic buying behavior. The 'IDC DVD' and 'IDC Stock' contract groups seem to best compensate for extreme variation since the indices remain more stable. In this run, contract indices for the DVD items increase to 101% by FY94 while stocked items increase to 103% by FY94.

Erratic buying activity is especially apparent in two particular cells. Contract measures for the 'DISC by BOA' cell soared between FY93 and FY94, jumping 19%, while the standard price only increases 10% during the same time period. The dollar weight associated with the 1,260 NSNs in the cell is small and barely influences overall indice measurements.

However, the 'DISC by BPA' cell is extremely large (19,600 NSNs) and significantly contributes to DISC performance. Contract material costs jumps 16% each year while the standard price increases 11% between FY93 and FY94. The indices are affected by a dozen NSNs with large variations in procurement quantities. In many cases, only one or two items were bought in FY93 or FY94 and the cost measures jump accordingly. The behavior of these cells should be monitored to see the influence of additional restrictions by comparing results to the 'Restricted Three out of Three' case.

Table 5-2.

COMMODITY BY CONTRACT TYPE
RESTRICTED TO BUYS IN BASE YR & AT LEAST 1 SUBSEQUENT YR

		C		E		G		I		H		T		ALL	
		CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX
BOA	FY92	100	100	100	100	100	100	100	100	100	100	0	0	100	100
	FY93	106	96	108	99	109	110	107	95	107	100	0	0	107	100
	FY94	112	101	116	108	120	120	126	105	118	107	0	0	118	107
IDC DVD	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	105	98	89	95	100	102	96	91	99	98	100	99	99	98
	FY94	109	110	86	101	104	103	97	87	101	103	104	103	101	103
IDC STOCKED	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	103	93	105	93	98	101	106	95	103	96	102	99	103	96
	FY94	105	96	106	93	96	97	105	96	103	96	104	104	103	97
LARGE MANUAL	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	104	90	104	100	103	98	102	95	103	96	102	97	103	97
	FY94	113	92	114	103	106	106	101	98	108	102	104	100	106	101
BPA	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	105	98	110	95	105	101	116	100	109	99	97	103	109	99
	FY94	110	102	118	100	108	104	132	111	117	105	92	101	117	105
SHIFT TO IDC	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	89	100	93	101	100	101	92	101	94	102	105	101	97
	FY94	99	89	103	94	104	97	100	92	101	93	104	104	105	97
P/O	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	107	93	108	92	105	101	110	94	108	94	108	98	108	95
	FY94	112	96	114	99	113	106	119	99	115	99	113	100	115	99
ALL	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	105	92	105	94	103	100	107	94	105	95	102	99	104	96
	FY94	109	96	110	98	107	104	113	98	109	99	104	101	108	100

5.2.3 'RESTRICTED THREE OUT OF THREE' CONTRACT-BASED INDICES

The third and last variation to the step-wise process further reduces the 'Unrestricted' population in the 'Restricted Three out of Three' run. NSNs are required to have contract buys in the base period and in *both* FY93 and FY94. This group of items represents those NSNs with the most consistent buying activity. NSNs under analysis (56,000 items) represent a small fraction of DLA's huge inventory but account for nearly half of DLA's actual annual materiel obligation outlays ($2.5 Billion in the commodities under study). The indices that are generated using these items provide a measure of the materiel cost of items that are routinely procured. These results are presented in Table 5-3. The 'ALL ALL' cell in Table 5-3 indicates that standard prices are fairly constant while contract prices are increasing at 3% per year. DLA has done a good job of holding standard prices down even though the material cost of acquiring materials rose 6% over a two year period.

Results from the 'Restricted Three out of Three' case have been reported to the ICPs, Admiral Straw and DoD. Due to the level of visibility, extensive work was performed to validate the measurements that were generated. Market baskets associated with the four hardware centers received the most attention due to the greater influence that these ICPs have on the overall index. Cells that indicated larger increases in indices received particular notice. NSNs that contributed the most to the increases were also identified. In two cases, erroneous contract information was pinpointed and eliminated from all iterations. Unfortunately, errors of this type cannot be screened out early on and must be eliminated in the final stage. During the later stages, one additional error was also identified for a C&T item that shifted to the IDC category. Results have been updated to reflect the change.

In general, the behavior of more erratic NSNs has been eliminated by requiring NSNs to have a contract buy each year. However, further analysis still confirms that NSNs *can* experience significant swings in contract buys and prices from year to year. Table 5-3 points out that indices for the 'DISC by BPA' category drop slightly from the measures generated in the 'Restricted Two out of Three' case, but still indicate large increases in materiel cost. Several NSNs that contribute the most to the large change in cost are identified in Figure 5-9.

Table 5-3.

COMMODITY BY CONTRACT TYPE
RESTRICTED TO BUYS IN BASE YR, FY 93 AND FY94

		C		E		G		I		H		T		ALL	
		CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX
BOA	FY92	100	100	100	100	100	100	100	100	100	100	0	0	100	100
	FY93	106	92	126	109	117	107	119	94	112	97	0	0	112	97
	FY94	105	98	113	124	116	127	121	116	111	110	0	0	111	110
IDC DVD	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	105	110	88	95	100	103	92	92	98	99	100	99	98	99
	FY94	110	117	85	101	105	104	93	86	100	104	105	103	101	104
IDC STOCKED	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	103	93	106	93	97	103	98	91	100	95	104	109	101	96
	FY94	106	96	104	100	97	94	98	91	101	94	108	111	101	96
LARGE MANUAL	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	110	89	98	97	99	96	99	91	102	94	104	97	103	96
	FY94	115	93	98	94	104	102	101	86	105	98	107	101	106	100
BPA	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	105	95	123	96	106	104	118	98	109	100	96	104	109	100
	FY94	109	100	122	104	109	107	119	105	112	105	95	98	111	105
SHIFT TO IDC	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	100	89	100	93	101	101	100	93	101	95	100	106	100	98
	FY94	95	88	100	93	104	98	97	92	100	93	114	108	105	97
P/O	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	110	93	110	92	106	101	108	94	108	94	109	93	108	94
	FY94	113	96	111	98	108	106	107	100	110	99	106	93	110	99
ALL	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	106	92	103	93	101	100	104	93	103	95	103	99	103	96
	FY94	107	95	102	98	105	102	103	96	105	98	108	102	106	99

NSN	CONTRACT	92 QTY	92 PRICE	93 QTY	93 PRICE	94 QTY	94 PRICE
I5310011345765	BPA	221	1.40	1	370.50	65	3.99
I5325004382048	BPA	520	0.30	200	7.65	1000	2.50
I5310012410768	BPA	24	19.50	1	12.60	1	23.97
I5320012214231	BPA	450	0.69	1	63.25	17	1.99
I5305012668397	BPA	800	2.00	370	36.02	265	23.40
I5305012728323	BPA	357	3.49	15	73.87	20	66.66
I5330012159671	BPA	190	6.66	3	123.08	2	31.73
I5315011195239	BPA	119	7.50	1	163.82	111	10.21
I5320013381026	BPA	100	10.71	1	171.60	26	10.21
I5315013344259	BPA	25	56.20	1	661.25	7	357.75

Figure 5-7. Items With Fluctuating Contract Prices And Buy Quantities

Again, the point must be emphasized that all contract types are counted equally. All contract categories must reckon with price inflation that occurs when the number of buys or unit prices change dramatically. Between the base period and FY94, it appears indefinite delivery contracts best control acquisition cost growth associated with extreme variation while BOAs and BPAs appear to have the most price growth.

Additional work was performed in response to DCSCs unusually high 'IDC DVD' and 'IDC Stocked' measurements, which are noticeably larger than those of the other ICPs (except for the 'C&T by IDC Stocked' cell). More than half of the increase in materiel costs can be attributed to price growth of lumber and plywood products. Small manual indices for DCSC are equally affected, as wood products are purchased under both categories. DCSC has been notified of the anomaly and has pursued an investigation. Further analysis revealed that no other FSCs were readily identifiable as being major contributors to materiel growth.

One area of interest is found in comparing the performance between the 'Restricted Two out of Three' and 'Restricted Three out of Three' test cases. Inferences on the possible costs associated with buying items with sporadic procurement patterns can be observed. This insight is possible since the 'Restricted Two out of Three' tracks the behavior of an additional 137,000 items that are not measured in the most restrictive case.

Results from the 'Restricted Two out of Three' run tend to be higher than indices generated in the two other cases. The indices suggest that DLA pays higher prices for items that are not routinely bought. Intuitively, DLA cannot provide incentives to industry to provide items at stable prices since buying patterns are sporadic at best. Several observations are apparent when comparing Table 5-2 and 5-3, the 'Restricted Two out of Three' and 'Restricted Three out of Three' runs.

While interactions at the ICP and contract level (i.e., 'DCSC by BOA') may vary, performance at the contract and center level (i.e., 'DCSC by ALL') for the most restrictive case drop across the board. As seen in the 'ALL ALL' cell, results from the 'Restricted Three out of Three' run generate lower materiel increases than those seen in the 'Restricted Two out of Three' run.

5.2.4 SHIFT TO IDC SUBANALYSIS

Over the past few years, the agency has advocated the move to procurement of items by indefinite delivery contracts. The move aimed to reduce customer prices under the assumption that longer term contracts would "lock" materiel costs in place, thereby reducing possible increases associated with items with frequent negotiations.

Only 6,538 items are included in analysis. As shown in Table 5-4, materiel acquisition costs by 'IDC DVD' and 'IDC Stocked' approaches are identical, where prices first increase by 1% and then again by 3%. DGSC contributes to almost half of the contracting actions for hardware items that shift and seem to be the most aggressive at pursuing IDC arrangements.

Table 5-4. COMMODITY BY CONTRACT TYPE
SHIFT TO IDC SUBANALYSIS
UNRESTRICTED AS TO BUYS IN 93 AND 94

		C		E		G		I		H		T		ALL	
		CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX	CUP INDEX	SUP INDEX
DVD	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	103	90	104	85	102	101	110	91	105	95	96	108	101	100
	FY94	112	92	109	91	102	105	107	89	105	97	102	105	104	101
STOCKED	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	89	100	93	101	99	100	91	101	93	102	104	101	97
	FY94	98	90	102	93	104	96	100	95	101	93	109	102	104	97
ALL	FY92	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	FY93	101	89	100	92	101	100	101	91	101	93	101	104	101	98
	FY94	99	90	102	93	104	97	100	94	101	94	108	102	104	97

SECTION 6
CONCLUSIONS

The Market Basket study was designed to measure change in cost experienced by DLA customers as well as the change in material cost which contributes significantly to the standard price of DLA materiel sold to the Services.

The demand-based indices proved more valuable in *raising discussions* regarding measures of affordability and changes in customer price than in providing an actual measure of change in price experienced by the customer. That is, the measurements of customer price were not as useful as expected. Instead, other results surfaced from the study, emphasizing the effects of DLA pricing policy, inventory levels and demand patterns and their measurable effect on standard unit price indices for items sold in any given period. These factors are more influential over marginal changes in the ranges measured than material cost. The predetermined price increases and the percent of sales supported by inventory (not the immediate acquisitions) tend to suppress the standard unit price indices in the demand-based market basket.

On the other hand, the Contract-Based Indices proved invaluable in identifying the contract types which exhibited the largest growth in material costs. Looking at the 'Restricted Three out of Three' case, small purchase procedures, both Purchase Orders and calls against Blanket Purchase Agreements (BPAs), increase over 10% in the FY92-94 period. Blanket Ordering Agreements (BOAs) also saw similar increases. The relatively small percent of dollars obligated by delivery orders under BOAs indicated large changes in material cost. But BOAs in DLA tend to be with sole source Original Equipment Manufacturers, which likely contribute to the observed increases. Large Contracts in excess of $25,000 experiences a 6% growth, an amount that is equal to the mean increase for the contract-based study population. Indefinite Delivery Contracts (IDCs) showed minimal growth regardless of support method (i.e., DVD or Stock). Items shifting to IDC DVD support did not exhibit a marked increase in materiel cost as was first expected. Initially, the agency assumed that IDC DVD arrangements would yield higher increases in cost since manufacturers assume the cost of managing and warehousing items. This assumption does not appear valid. Gross Center to Center comparisons should be avoided since many apparent conclusions would prove incorrect when examined using detailed analysis. *The most fundamental conclusion was that long term pricing arrangements are far superior to traditional SAMMS purchase order/call order methods of material acquisition in controlling price growth.*

The size and rate of growth associated with the Contract-Based Indices, combined with the lack of procurement data available in the Demand-Based Indices, points out potential problems. It appears that DLA is living off of inventory, temporarily circumventing the need to restock items. However, the Contract-Based Indices point out that once DLA begins to restock items, the result will be higher material costs and eventually higher customer prices.

In summary, the study had to cope with the same trade-offs that are present in all existing DLA measures of change in customer price. The chosen population and method of assigning annual price and quantity can influence the measure more than any actual occurance that can be isolated in the study. The restricted contract-based indices proved most reliable as a model of current acquisition processes.

6.1 RECOMMENDATIONS

After discussions with each of the ICPs, MMP is supporting work that will develop a change to the view in material cost. The different view of item performance can then be compared to results from the Market Basket study. Work is being performed and will focus on the most recent quantities and price history instead of indexing to a base year. This method will not produce indices since the market basket would change each time the view is updated. The advantage of this approach is the use of actual quantities along with current day prices. However, it would be no better in coping with changes in prices caused by significant variations in quantity without dropping buys where the variations occur.

MMP is also looking at further ways to support Buy Response Vice Inventory initiatives using results from the Market Basket study and preliminary data analysis. Items with higher buying frequency will be identified as potential BRVI candidates.

Additional analysis will be required if Market Basket Indices are to be continued. Analysis should focus on the benefit of continuing to use FY92 as the base period. Since this time, a huge number of CIT items are currently being managed by DLA. Most of the CIT items are not included in the study since the majority of the items' transition from the service to DLA occurred after FY92. Eventually, the Market Basket should be reindexed to incorporate these items in study results. Furthermore, the base year should be periodically reevaluated to determine the accuracy of item make-up. That is, as more and more items become inactive, the items being analyzed should be "refreshed" by reinitializing the base year.

APPENDIX A

COMMODITY COUNT

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COMMODITY BY SERVICE
COUNT OF NSNs IN EACH MARKET BASKET
UNRESTRICTED AS TO DEMAND IN 93 AND 94

	C NSN CNT	E NSN CNT	G NSN CNT	I NSN CNT	H NSN CNT	T NSN CNT	ALL NSN CNT
AIR FORC	37,750	57,398	32,358	71,600	199,106	3,224	202,330
ARMY	39,511	32,590	23,387	52,891	148,379	3,289	151,668
MARINES	14,345	8,856	7,196	15,758	46,155	2,125	48,280
NAVY	72,426	79,299	44,936	107,329	303,990	3,365	307,355
OTHER	15,434	21,488	13,845	25,824	76,591	3,316	79,907
ALL	179,466	199,631	121,722	273,402	774,221	15,319	789,540

COMMODITY BY SERVICE
COUNT OF NSNs IN EACH MARKET BASKET
RESTRICTED AS TO DEMAND IN 93 AND 94
(NSN BY SERVICE)

	C NSN CNT	E NSN CNT	G NSN CNT	I NSN CNT	H NSN CNT	T NSN CNT	ALL NSN CNT
AIR FORC	27,145	37,861	24,002	53,126	142,134	3,059	145,193
ARMY	30,436	24,590	18,590	42,265	115,881	3,082	118,963
MARINES	12,276	7,558	6,442	13,725	40,001	2,063	42,064
NAVY	46,461	51,466	31,839	75,127	204,893	3,269	208,162
OTHER	13,083	16,708	11,907	22,113	63,811	3,215	67,026
ALL	129,401	138,183	92,780	206,356	566,720	14,688	581,408

COMMODITY BY CONTRACT TYPE
NSN COUNTS IN EACH MARKET BASKET
UNRESTRICTED AS TO BUYS IN 93 AND 94

	C NSN CNT	E NSN CNT	G NSN CNT	I NSN CNT	H NSN CNT	T NSN CNT	ALL NSN CNT
BOA	6,091	2,539	5,894	7,498	22,022	0	22,022
IDC DVD	18,476	135	1,704	151	20,466	50	20,516
IDC STOCKED	13,747	1,490	362	1546	17,145	235	17,380
LARGE MANUAL	2,926	2,428	4,684	1893	11,931	3,932	15,836
BPA	43,445	32,885	24,627	79451	180,408	587	180,995
SHIFT TO IDC	2,038	1,085	939	1881	5,943	595	6,538
P/O	74,921	124,900	52,540	119,134	371,495	1,082	368,728
ALL	161,644	165,462	90750	207,705	629,410	6,481	632,042

COMMODITY BY CONTRACT TYPE
CONTRACT LINE COUNTS IN EACH MARKET BASKET
UNRESTRICTED AS TO BUYS IN 93 AND 94

		C CLIN CNT	E CLIN CNT	G CLIN CNT	I CLIN CNT	H CLIN CNT	T CLIN CNT	ALL CLIN CNT
BOA	FY92	14,135	5,075	14,033	13,745	46,988	0	46,988
	FY93	5,310	703	3,664	2,503	12,180	0	12,180
	FY94	3,237	608	2,576	2,047	8,468	0	8,468
IDC DVD	FY92	75,101	13,300	71,498	594	160,493	231	160,724
	FY93	48,699	8,312	64,300	273	121,584	134	121,718
	FY94	44,908	7,166	67,692	1,347	121,113	428	121,541
IDC STOCKED	FY92	31,253	7,408	1,805	4,875	45,341	687	46,028
	FY93	10,422	2,868	1,110	2,178	16,578	193	16,771
	FY94	7,998	1,255	895	1,210	11,358	86	11,444
LARGE MANUAL	FY92	10,934	9,649	17,788	4,701	43,072	7,735	50,807
	FY93	4,601	3,107	6,809	1,104	15,621	2,344	17,965
	FY94	3,054	1,995	6,895	857	12,801	2,336	15,137
BPA	FY92	77,651	53,033	60,009	124,652	315,345	2,140	317,485
	FY93	21,628	13,530	29,042	28,367	92,567	1,044	93,611
	FY94	12,909	9,891	28,851	16,745	68,396	1,113	69,509
SHIFT TO IDC	FY92	11,087	5,916	8,880	7,721	33,604	1,682	35,286
	FY93	9,379	4,372	13,315	5,635	32,701	2,819	35,520
	FY94	12,968	4,751	20,068	4,181	41,968	2,848	44,816
P/O	FY92	177,066	232,985	124,112	198,537	732,700	1,593	734,293
	FY93	65,650	61,275	44,531	53,507	224,963	273	225,236
	FY94	53,831	42,993	43,652	43,741	184,217	236	184,453
ALL	FY92	397,227	327,366	298,125	354,825	1,377,543	14,068	1,391,611
	FY93	165,689	94,167	162,771	93,567	516,194	6,807	523,001
	FY94	138,905	68,659	170,629	70,128	448,321	7,047	455,368

COMMODITY BY CONTRACT TYPE
NSN COUNTS IN EACH MARKET BASKET
RESTRICTED TO BUYS IN BASE YR & AT LEAST 1 SUBSEQUENT YR

	C NSN CNT	E NSN CNT	G NSN CNT	I NSN CNT	H NSN CNT	T NSN CNT	ALL NSN CNT
BOA	1,717	297	1,423	1,260	4,697	0	4,697
IDC DVD	9,700	86	1,321	120	11,227	26	11,253
IDC STOCKED	5,482	448	188	851	6,969	49	7,018
LARGE MANUAL	631	401	1,622	309	2,963	1,287	4,450
BPA	13,325	7,319	6,908	19,600	47,152	215	47,367
SHIFT TO IDC	1,765	998	917	1,793	5,473	556	6,029
P/O	27,345	32,877	18,168	33,872	112,262	139	112,401
ALL	59,965	42,426	30,547	57,805	190,743	2,272	193,215

COMMODITY BY CONTRACT TYPE
CONTRACT LINE COUNTS IN EACH MARKET BASKET
RESTRICTED TO BUYS IN BASE YR & AT LEAST 1 SUBSEQUENT YR

		C CLIN CNT	E CLIN CNT	G CLIN CNT	I CLIN CNT	H CLIN CNT	T CLIN CNT	ALL CLIN CNT
BOA	FY92	5,366	808	4,230	3,393	13,797	0	13,797
	FY93	4,453	610	3,225	1,950	10,238	0	10,238
	FY94	2,537	485	2,174	1,562	6,758	0	6,758
IDC DVD	FY92	57,130	12,796	70,047	454	140,427	115	140,542
	FY93	48,672	8,305	64,234	273	121,484	134	121,618
	FY94	44,898	7,162	67,677	1,347	121,084	428	121,512
IDC STOCKED	FY92	15,705	3,418	1,301	3,036	23,460	252	23,712
	FY93	10,374	2,867	1,064	2,149	16,454	193	16,647
	FY94	7,994	1,253	885	1,198	11,330	84	11,414
LARGE MANUAL	FY92	4,392	2,829	9,272	1,535	18,028	3,292	21,320
	FY93	3,389	2,230	5,811	897	12,327	2,217	14,544
	FY94	2,574	1,597	6,120	631	10,922	2,224	13,146
BPA	FY92	30,167	15,782	27,964	36,646	110,559	1,536	112,095
	FY93	19,901	11,636	27,368	25,545	84,450	853	85,303
	FY94	11,305	8,057	27,349	14,422	61,133	801	61,934
SHIFT TO IDC	FY92	9,701	5,166	8,742	7,209	30,818	1,444	32,262
	FY93	9,379	4,372	13,315	5,635	32,701	2,819	35,520
	FY94	12,968	4,751	20,068	4,181	41,968	2,835	44,803
P/O	FY92	86,443	77,353	56,630	72,272	292,698	516	293,214
	FY93	60,089	57,505	39,573	46,275	203,442	238	203,680
	FY94	48,276	40,127	37,930	36,881	163,214	204	163,418
ALL	FY92	208,904	118,152	178,186	124,545	629,787	7,155	636,942
	FY93	156,257	87,525	154,590	82,724	481,096	6,454	487,550
	FY94	130,552	63,432	162,203	60,222	416,409	6,576	422,985

COMMODITY BY CONTRACT TYPE
NSN COUNTS IN EACH MARKET BASKET
RESTRICTED TO BUYS IN BASE YR, FY93 AND FY94

	C NSN CNT	E NSN CNT	G NSN CNT	I NSN CNT	H NSN CNT	T NSN CNT	ALL NSN CNT
BOA	400	64	321	203	988	0	988
IDC DVD	4,464	51	780	49	5,344	21	5,365
IDC STOCKED	1,706	189	81	368	2,344	12	2,356
LARGE MANUAL	126	79	467	65	737	513	1,250
BPA	3,215	1,568	1,702	4,004	10,489	83	10,572
SHIFT TO IDC	958	514	614	906	2,992	195	3,187
P/O	8,745	8,419	5,768	9,069	32,001	25	32,026
ALL	19,614	10,884	9,733	14,664	54,895	849	55,744

COMMODITY BY CONTRACT TYPE
CLIN COUNTS IN EACH MARKET BASKET
RESTRICTED TO BUYS IN BASE YR, FY93 AND FY94

		C CLIN CNT	E CLIN CNT	G CLIN CNT	I CLIN CNT	H CLIN CNT	T CLIN CNT	ALL CLIN CNT
BOA	FY92	1,387	191	1,028	757	3,363	0	3,363
	FY93	1,529	205	1,102	649	3,485	0	3,485
	FY94	1,241	222	1,021	507	2,991	0	2,991
IDC DVD	FY92	41,636	12,456	59,515	260	113,867	91	113,958
	FY93	39,746	8,071	58,002	206	106,025	107	106,132
	FY94	40,943	6,982	66,838	515	115,278	327	115,605
IDC STOCKED	FY92	5,703	1,480	758	1,480	9,421	66	9,487
	FY93	5,121	1,427	570	1,160	8,278	81	8,359
	FY94	5,037	848	628	818	7,331	28	7,359
LARGE MANUAL	FY92	1,288	760	3,669	584	6,301	1,206	7,507
	FY93	1,160	768	2,880	389	5,197	1,256	6,453
	FY94	1,143	696	2,975	304	5,118	1,256	6,374
BPA	FY92	8,659	4,109	13,541	8,090	34,399	1,265	35,664
	FY93	7,179	3,843	16,262	7,881	35,165	747	35,912
	FY94	5,959	3,308	17,168	6,491	32,926	569	33,495
SHIFT TO IDC	FY92	6,325	2,763	7,170	4,135	20,393	592	20,985
	FY93	7,746	3,025	12,608	4,343	27,722	1,085	28,807
	FY94	11,577	3,993	18,819	3,306	37,695	2,460	40,155
P/O	FY92	35,131	23,245	21,718	22,693	102,787	269	103,056
	FY93	31,583	23,793	20,875	20,653	96,904	108	97,012
	FY94	28,987	20,076	21,095	16,070	86,228	82	86,310
ALL	FY92	100,129	45,004	107,399	37,999	290,531	3,489	294,020
	FY93	94,064	41,132	112,299	35,281	282,776	3,384	286,160
	FY94	94,887	36,125	128,544	28,011	287,567	4,722	292,289

COMMODITY BY SHIFT TO IDC
NSN COUNT IN EACH MARKET BASKET
UNRESTRICTED AS TO BUYS IN 93 AND 94

	C NSN CNT	E NSN CNT	G NSN CNT	I NSN CNT	H NSN CNT	T NSN CNT	ALL NSN CNT
DVD	458	33	450	130	1071	34	1105
STOCKED	1580	1052	489	1751	4872	561	5433
DVD AND STOCKED	2038	1085	939	1881	5943	595	6538

COMMODITY BY SHIFT TO IDC
CONTRACT LINE COUNT IN EACH MARKET BASKET
UNRESTRICTED AS TO DEMAND IN 93 AND 94

		C CLIN CNT	E CLIN CNT	G CLIN CNT	I CLIN CNT	H CLIN CNT	T CLIN CNT	ALL CLIN CNT
DVD	FY92	1335	118	2504	766	4723	85	4808
	FY93	2026	114	4675	1429	8244	207	8451
	FY94	2567	289	7319	1575	11750	883	12633
STOCKED	FY92	9752	5798	6376	6955	28881	1597	30478
	FY93	7353	4258	8640	4206	24457	2612	27069
	FY94	10401	4462	12749	2606	30218	1965	32183
DVD AND STOCKED	FY92	11087	5916	8880	7721	33604	1682	35286
	FY93	9379	4372	13315	5635	32701	2819	35520
	FY94	12968	4751	20068	4181	41968	2848	44816

APPENDIX B

SPORADIC BUY INDEX

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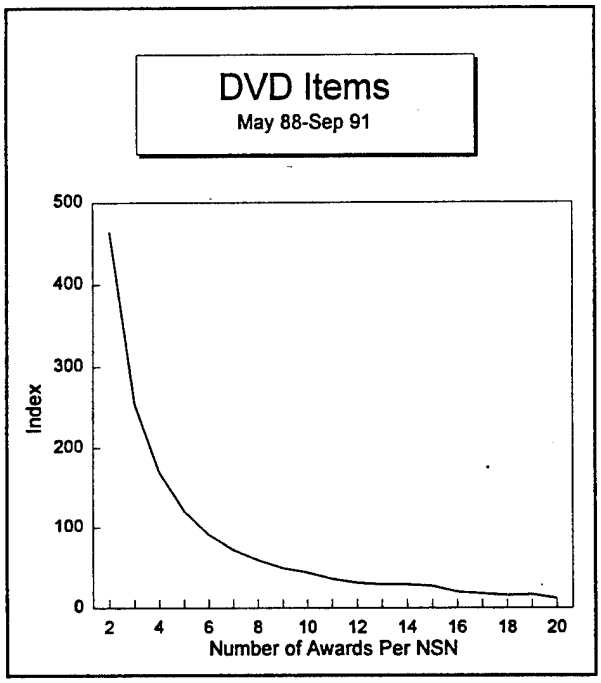
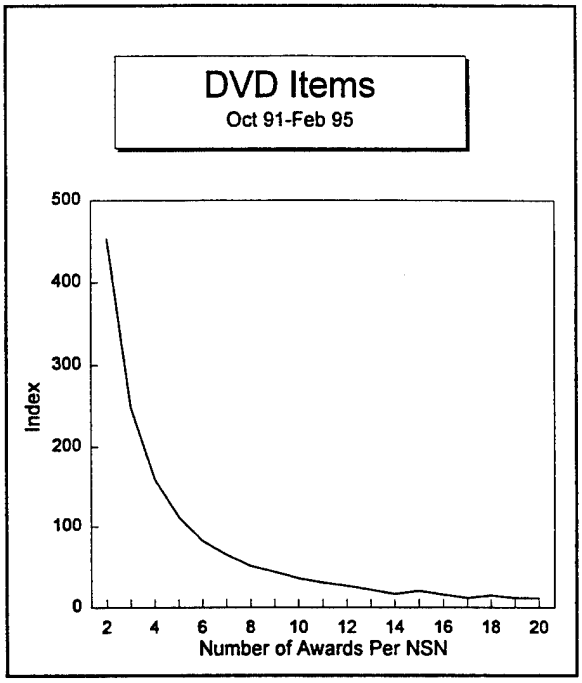
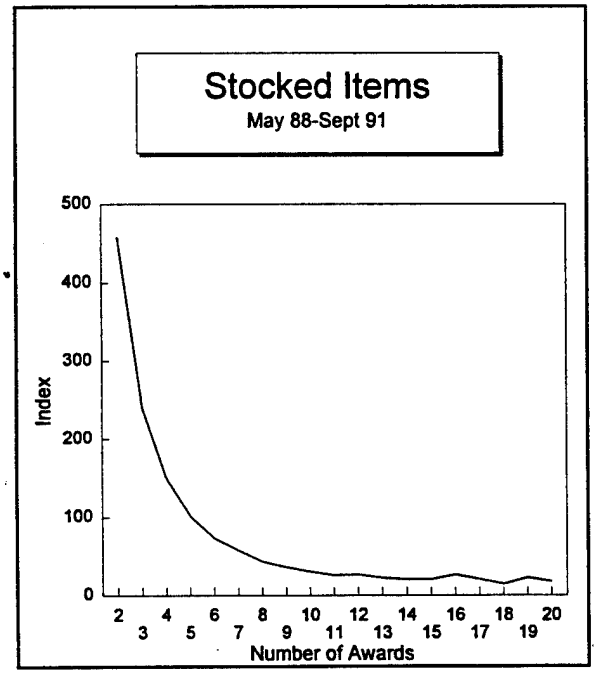
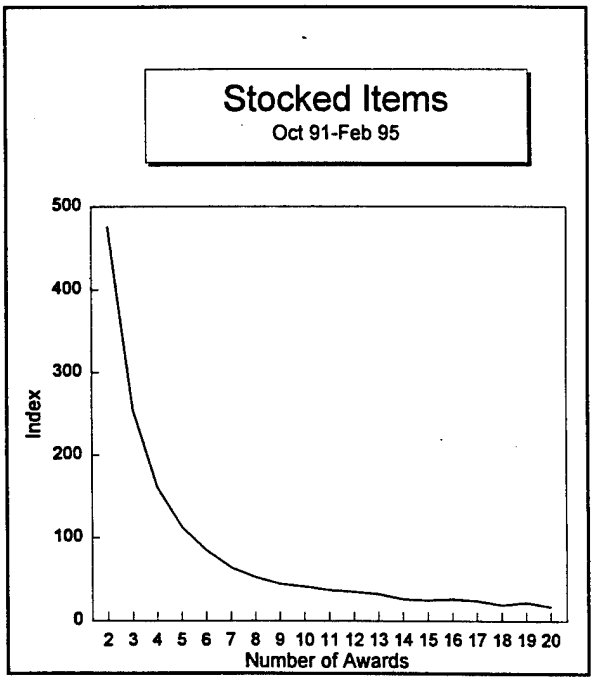
Sporadic Buy Index Construction









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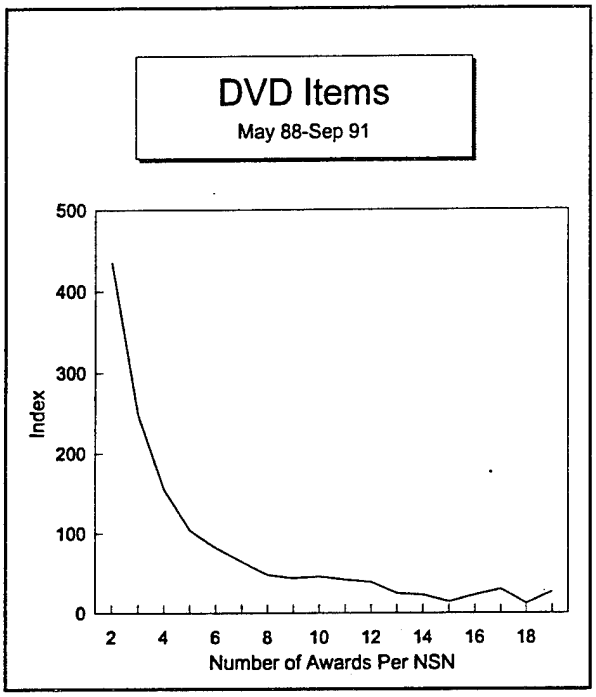
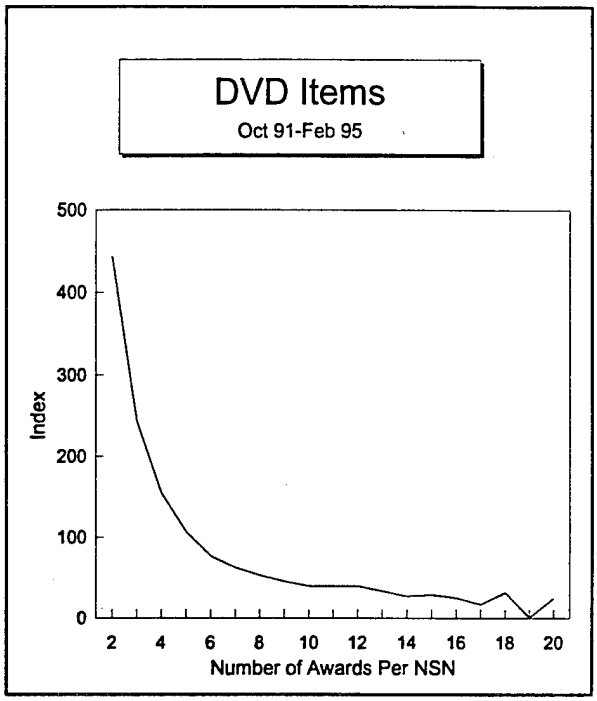
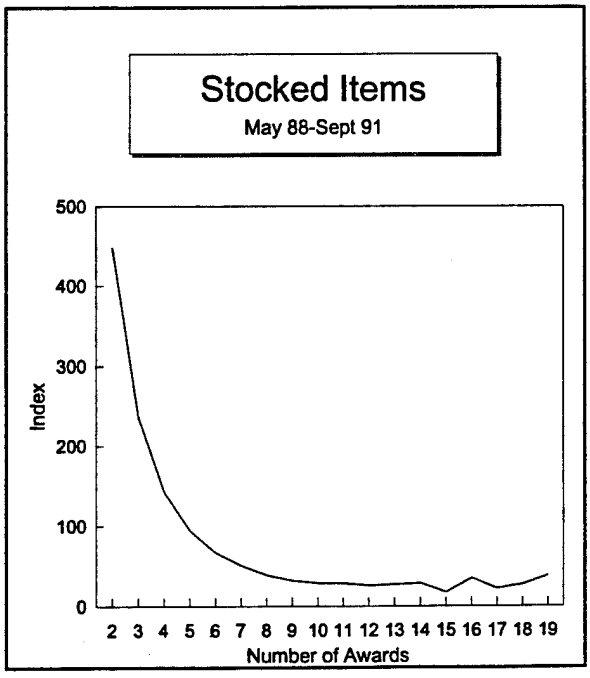
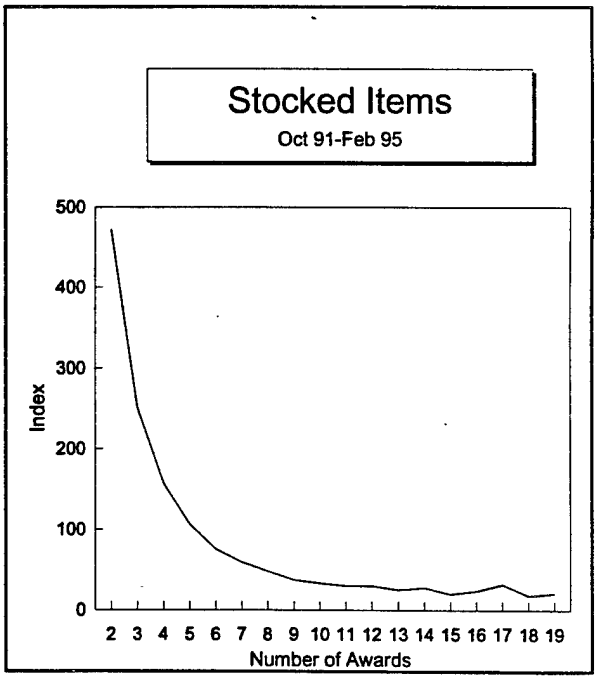
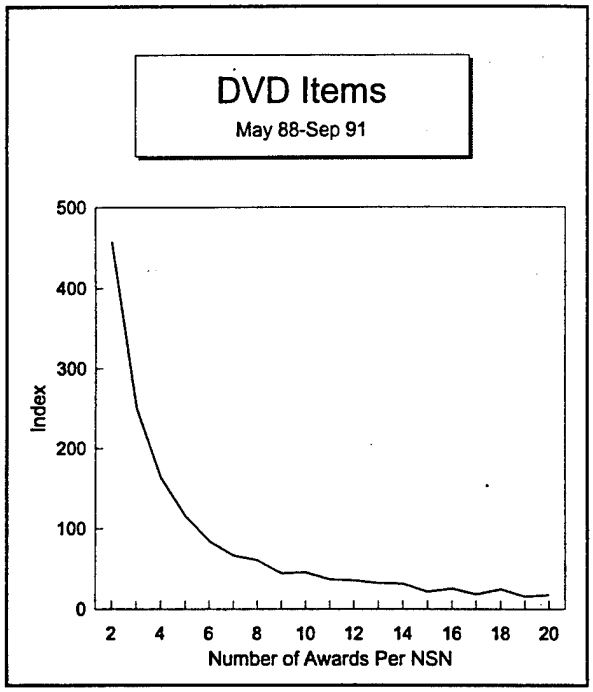


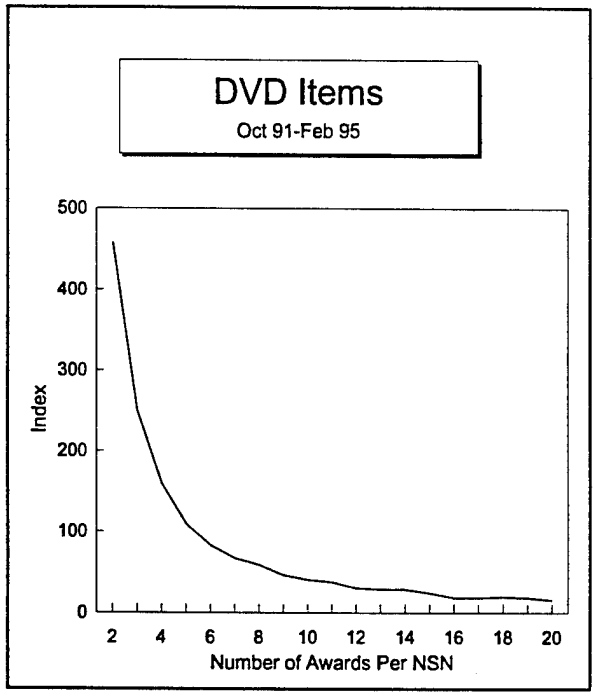


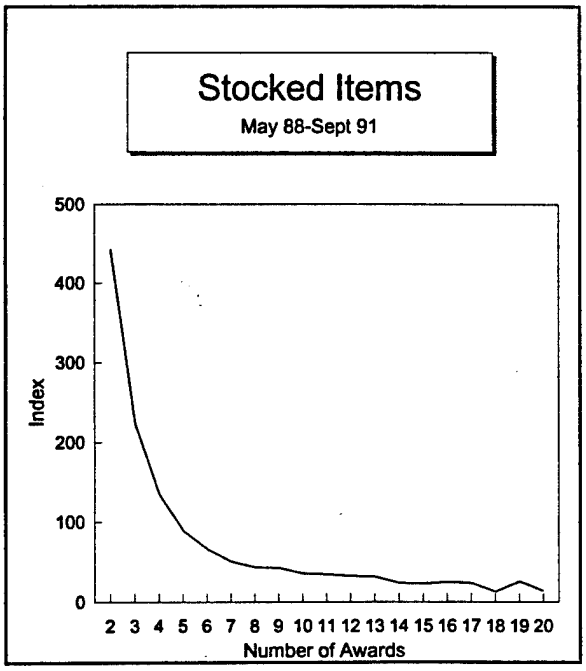


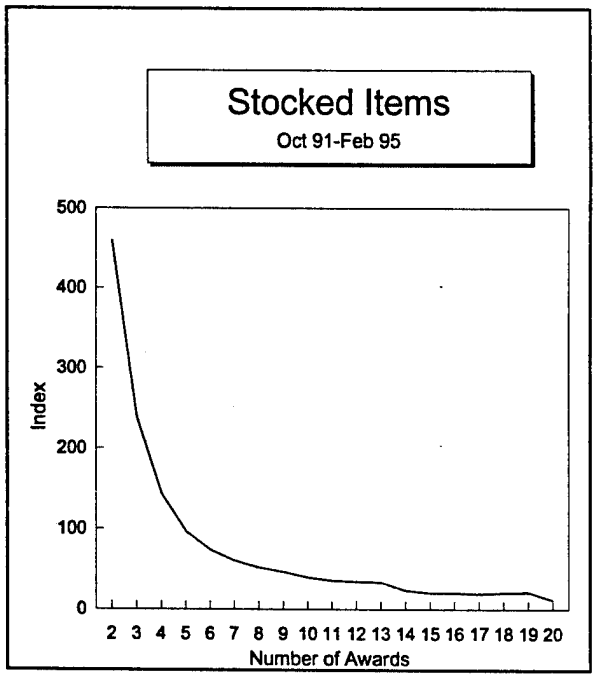


Sporadic Buy Index General









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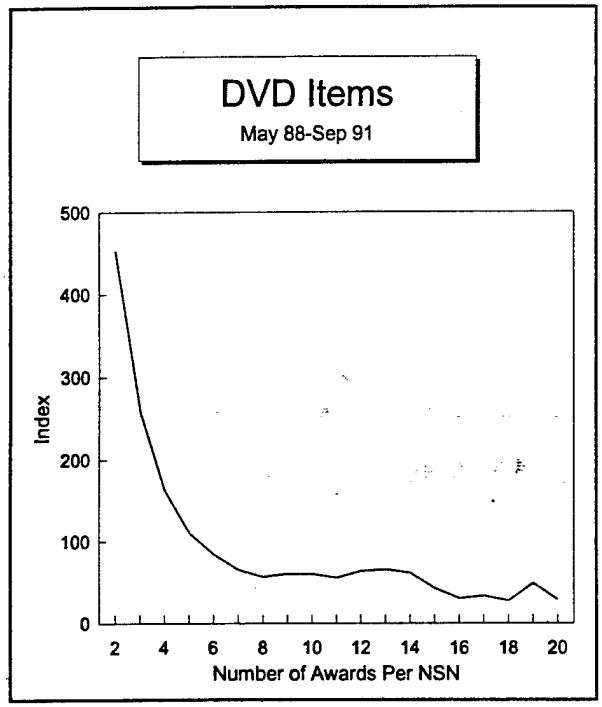
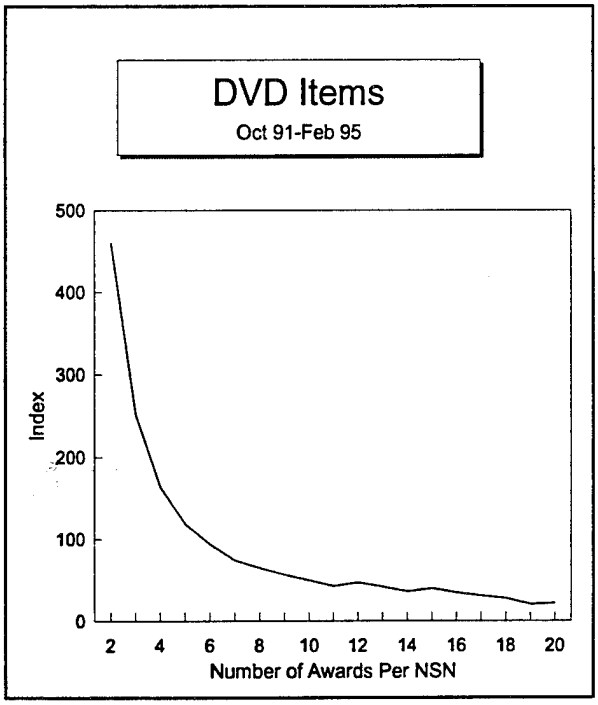
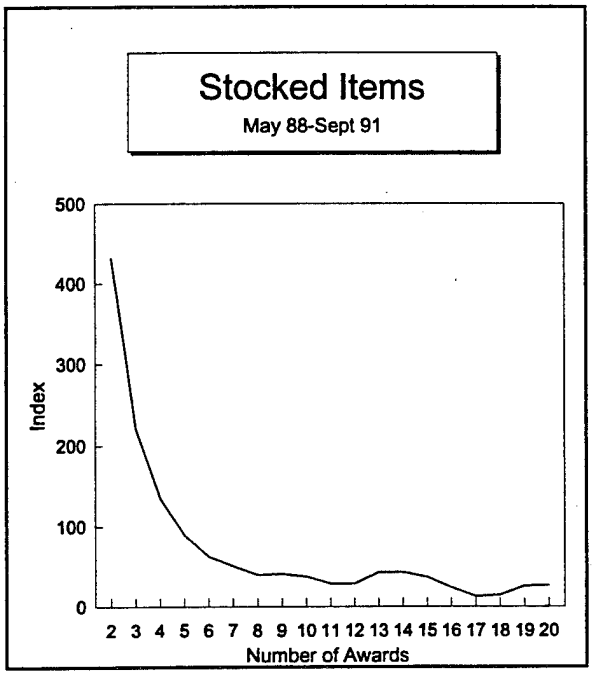
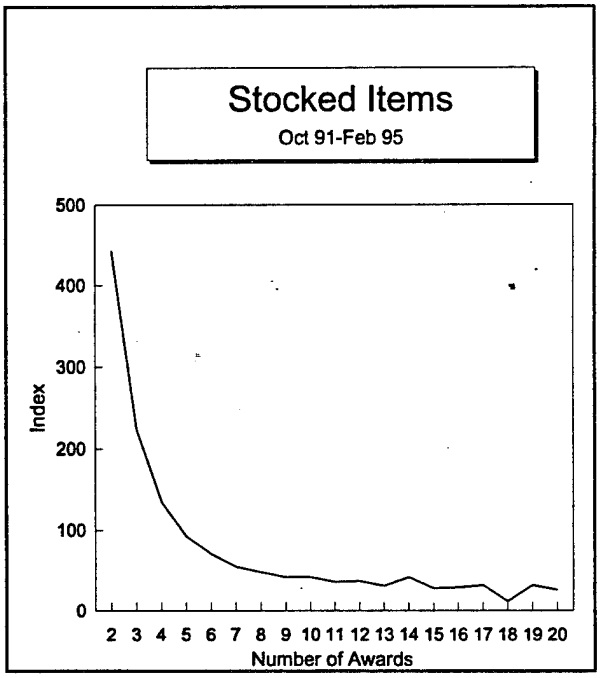
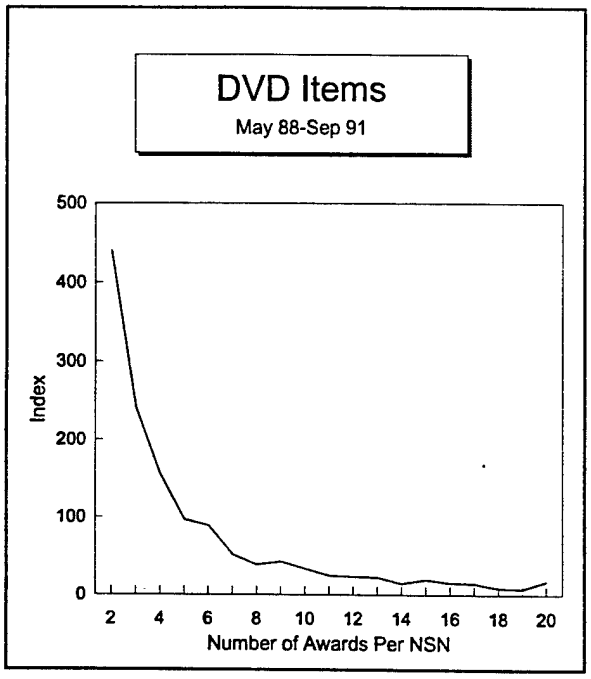


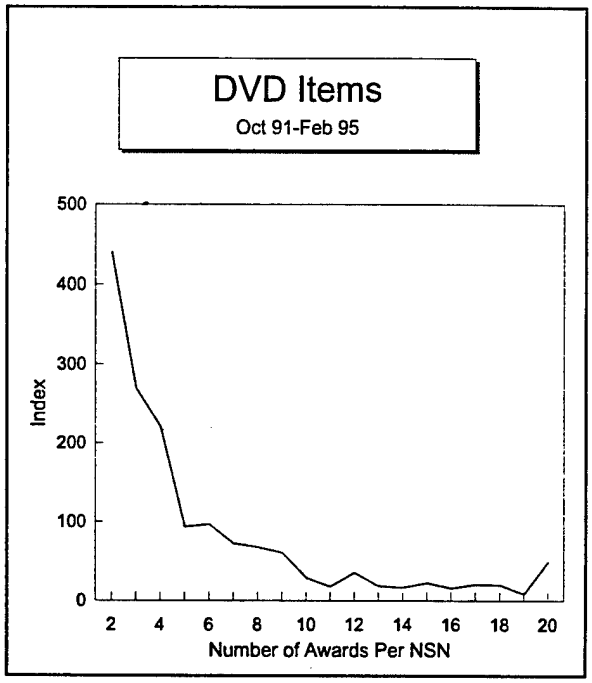


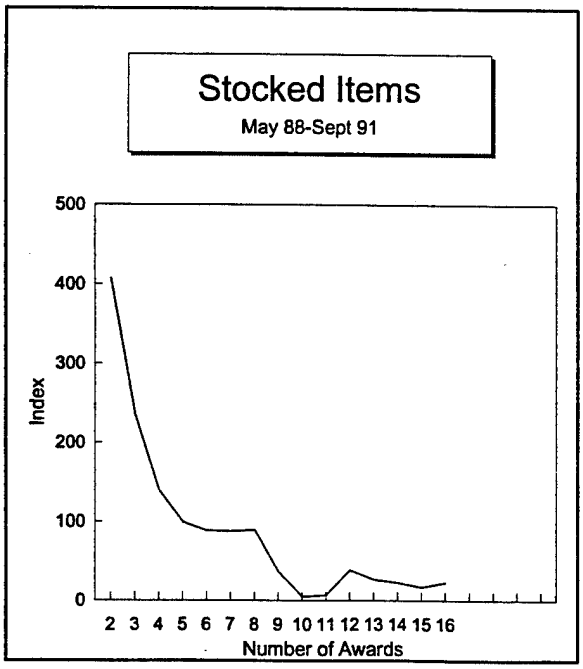


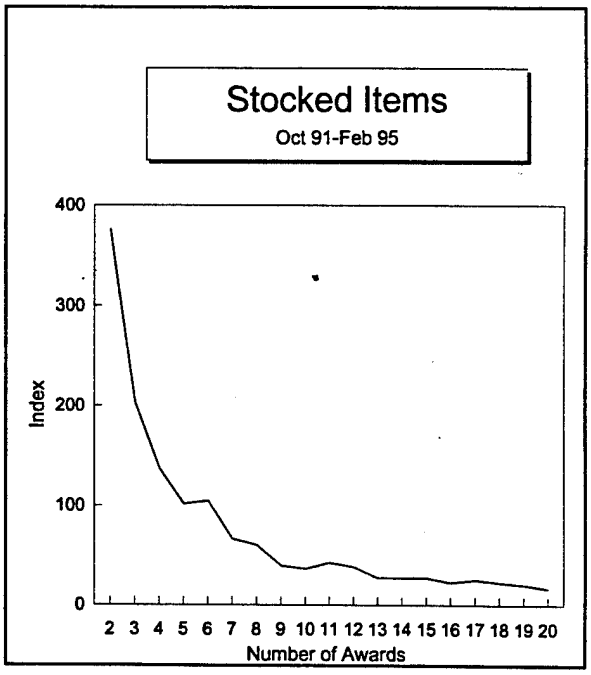


Sporadic Buy Index
Textile









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13. ABSTRACT *(Maximum 200 words)*

The primary objective of this study effort was to provide DLA management with the ability to evaluate DLA performance in controlling the material cost of items sold to the services. A series of indices, similar in concept to that used to calculate the Consumer Price Index, was developed that allowed comparison in DLA price and cost growth or decline relative to general market trends. Two seperate general measures that distinguish between the price of goods sold and the cost of goods bought were created. In addition, index substratifications were examined to determine any differences in prices experienced by the various services and to identify any advantages in cost control by various procurement instruments such as indefinite delivery contracts. Other facets of the indices were developed by restricting the items under consideration to those that generated consistent demand over the time periods or those that consistently had buys over the time period.

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UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	

GENERAL INSTRUCTIONS FOR COMPLETING SF 298

The Report Documentation Page (RDP) is used in announcing and cataloging reports. It is important that this information be consistent with the rest of the report, particularly the cover and title page. Instructions for filling in each block of the form follow. It is important to ***stay within the lines*** to meet ***optical scanning requirements***.

Block 1. Agency Use Only *(Leave blank)*.

Block 2. Report Date. Full publication date including day, month, and year, if available (e.g. 1 Jan 88). Must cite at least the year.

Block 3. Type of Report and Dates Covered. State whether report is interim, final, etc. If applicable, enter inclusive report dates (e.g. 10 Jun 87 - 30 Jun 88).

Block 4. Title and Subtitle. A title is taken from the part of the report that provides the most meaningful and complete information. When a report is prepared in more than one volume, repeat the primary title, add volume number, and include subtitle for the specific volume. On classified documents enter the title classification in parentheses.

Block 5. Funding Numbers. To include contract and grant numbers; may include program element number(s), project number(s), task number(s), and work unit number(s). Use the following labels:

C	- Contract	**PR**	- Project
G	- Grant	**TA**	- Task
PE	- Program Element	**WU**	- Work Unit Accession No.

Block 6. Author(s). Name(s) of person(s) responsible for writing the report, performing the research, or credited with the content of the report. If editor or compiler, this should follow the name(s).

Block 7. Performing Organization Name(s) and Address(es). Self-explanatory.

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Block 9. Sponsoring/Monitoring Agency Name(s) and Address(es). Self-explanatory.

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Block 11. Supplementary Notes. Enter information not included elsewhere such as: Prepared in cooperation with...; Trans. of...; To be published in.... When a report is revised, include a statement whether the new report supersedes or supplements the older report.

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- **DOD** - See DoDD 5230.24, "Distribution Statements on Technical Documents."
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Block 13. Abstract. Include a brief *(Maximum 200 words)* factual summary of the most significant information contained in the report.

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